UNSW Engineering

Education Specification

1. Program Overview

Program Title: Bachelor of Engineering (Honours)

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

Engineering Discipline: Aerospace Engineering

This report shows how the AEROAH Aerospace Engineering specialisation of the 3707 Bachelor of Engineering (Honours) program at UNSW fosters the Engineers Australia Level 1 Graduate Competencies in its students.

The Aerospace Engineering specialisation covers the analysis, design and operation of aircraft and spacecraft. Graduates work mainly on the design and manufacture of flight vehicles, their operation with satellite production and airlines and research for civil and military aerospace organisations.

The report outlines the overall aims of the specialisation and its distinct features, describes the specialisation plan, and presents the Specialisation Learning Outcomes (SLOs). It also details the process used to develop these SLOs and gather feedback for their improvement. This is followed by a curriculum mapping that links individual courses to the SLOs and Graduate Capabilities, and aligns the SLOs with the Graduate Capabilities.

2. Career Alignment

Our students study fixed wing aircraft (subsonic, transonic, supersonic and hypersonic), helicopters, multi-copters, and spacecraft (launch vehicles, satellites, etc.). Both fixed wing hypersonic aircraft (scramjets) and multi-copters are emerging fields. They are introduced to the electrification of aircraft (full and hybrid) in the elective (Advanced Aerospace Propulsion) which is another emerging field. They are exposed to the latest in materials technology.

They all can experience flight through a modern flight simulator and through flight exercises at Bankstown airport. For students going to work on aircraft systems, this will provide them with first-hand experience on how to fly them. This sets our students up for a multitude of industry roles not just in the existing aerospace industry but also in the emerging aerospace industry.

3. Specialisation Framework

The Specialisation Learning Outcomes (SLOs) were initially developed by the School Education Committee, led by the Specialisation Lead. They were informed by benchmarking undertaken for the 2026 accreditation report, feedback from industry partners, and expectations of graduate outcomes aligned with EA Stage 1 competencies.

The draft SLOs were subsequently reviewed and refined by the Deputy/Associate Head of School (Education) before being presented to the School Education Committee for endorsement. Consultation with the School Industry Advisory Board (IAB) was conducted via email and followed by a dedicated workshop to gather further feedback. The SLOs are periodically reviewed by IAB, with the next review scheduled for May 2026.The SLOs are aligned with the Engineers Australia expectations for a graduate engineer, while being articulated specifically within the context of Aerospace Engineering. Accordingly, they reference both Aerospace-specific disciplineary knowledge and the professional and technical skills required for practice in the aerospace sector.

On successful completion of the AEROAH3707 program, graduates will be able to:

SLO1	Demonstrate proficiency of knowledge in the enabling sciences (mathematics, computer science and physics) that form the foundation of aerospace engineering.
SLO2	Demonstrate expertise and technical knowledge in underpinning aerospace engineering disciplines such as mechanics, thermodynamics, fluid mechanics, mechanics of solids and structures and manufacturing.
SLO3	Recognise and comply with the national and international regulatory environments under which aircraft and space systems operate and the role that aerospace engineers play in the continued safe operation of the aviation industry.
SLO4	Use appropriate analytical, computational and AI tools, both general and specialised, to solve complex problems in aerospace engineering.
SLO5	Analyse and design integrated aerospace systems considering the fundamental facets of safe and controlled flight: aerospace structures, aerodynamics, flight dynamics and stability, propulsion, and avionics.
SLO6	Design and implement innovative engineering solutions to complex problems in aerospace engineering that consider technical, economic, social and environmental implications, based on rigorous analysis and application of critically evaluated current research.
SLO7	Demonstrate a high level of personal autonomy, perseverance, ethical conduct, and professional accountability when working as an individual and within diverse multi-cultural and multi-disciplinary team environments.
SLO8	Communicate professionally and effectively within and outside of aerospace engineering.

4. Continuous Improvement

The Head of School, Deputy Head (Education), Associate Head of School (Education), and the School Education Committee (SEC) have the overall responsibility for the management of the undergraduate and postgraduate coursework programs within the School. SEC meets regularly to discuss coordination of teaching, program review, designing new courses, revision of existing courses, course organisation and administration, and students' feedback on courses, etc.

Proposals for new courses or course revisions are arise from discussion among all staff in the discipline, together with input from relevant industry representatives. New proposals for both undergraduate and postgraduate elective courses are generally initiated by academic staff in the discipline and are informed by emerging industry needs and developments in research. Any proposed cchanges are first considered by the SEC and then at the School level through the School Management Committee before progressing through the university's formal approval processes.

To ensure program design is informed by ongoing evaluation of practice, industry needs, and emerging demands, the School draws on regular input from the Industry Advisory Board and engagement with Industry Partners. The School has active partnerships with industry organisations that provide regular input on current practice and workforce needs, including through engagement with academic staff and guest lectures. In addition, as Australia's top-ranked Mechanical school, many courses are taught by academics who lead internationally recognised research programs. This leadership, together with strong industry links, keeps teaching research-informed and up to date.

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

A curriculum mapping exercise has been carried out for the AEROAH Aerospace Engineering specialisation of the 3707 Bachelor of Engineering (Honours) program at UNSW. The specialisation covers all the Engineers Australia Stage 1 Graduate Competencies.

The mapping ensures alignment among CLOs, SLOs, and PLOs within the specialisation. CLOs are created by course coordinators to support relevant SLOs while addressing the specific technical knowledge, skills, and practices expected of students. Each assessment task is clearly mapped to CLOs to ensure direct measurement of student achievement.

UNSW SYDNEY

Table 1. Mapping of the specialisation learning outcomes to the Engineers Australia Stage 1 Competencies

SLO/PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14.	PLO15	PLO16
1. Demonstrate proficiency of knowledge in the enabling sciences (mathematics, computer science and physics) that form the foundation of aerospace engineering.	x	x														
2. Demonstrate expertise and technical knowledge in underpinning aerospace engineering disciplines such as: mechanics, thermodynamics, fluid mechanics, mechanics of solids and structures and manufacturing.			x				x	x	x	x						
3. Recognise and comply with the national and international regulatory environments under which aircraft and space systems operate and the role that aerospace engineers play in the continued safe operation of the aviation industry.				x	x	x					x					
4. Use appropriate analytical, computational and AI tools, both general and specialised, to solve complex problems in aerospace engineering.					x		x	x	x							
5. Analyse and design integrated aerospace systems considering the fundamental facets of safe and controlled flight: aerospace structures, aerodynamics, flight dynamics and stability, propulsion, and avionics.		x	x				x	x	x	x						
6. Design and implement innovative engineering solutions to complex problems in aerospace engineering that consider technical, economic, social and environmental implications, based on rigorous analysis and application of critically evaluated current research.				x	x	x	x	x	x	x	x					x
7. Demonstrate a high level of personal autonomy, perseverance, ethical conduct, and professional accountability when working as an individual and within diverse multi-cultural and multi-disciplinary team environments.											x		x	x	x	x
8. Communicate professionally and effectively within and outside of aerospace engineering.												x				

Table 2. Mapping of courses to the specialisation learning outcomes

SLO	1. Demonstrate proficiency of knowledge in the enabling sciences (mathematics, computer science and physics) that form the foundation of aerospace engineering.	2. Demonstrate expertise and technical knowledge in underpinning aerospace engineering disciplines such as: mechanics, thermodynamics, fluid mechanics, mechanics of solids and structures and manufacturing.	3. Recognise and comply with the national and international regulatory environments under which aircraft and space systems operate and the role that aerospace engineers play in the continued safe operation of the aviation industry.	4. Use appropriate analytical, computational and AI tools, both general and specialised, to solve complex problems in aerospace engineering.	5. Analyse and design integrated aerospace systems considering the fundamental facets of safe and controlled flight: aerospace structures, aerodynamics, flight dynamics and stability, propulsion, and avionics.	6. Design and implement innovative engineering solutions to complex problems in aerospace engineering that consider technical, economic, social and environmental implications, based on rigorous analysis and application of critically evaluated current rese	7. Demonstrate a high level of personal autonomy, perseverance, ethical conduct, and professional accountability when working as an individual and within diverse multi-cultural and multi-disciplinary team environments.	8. Communicate professionally and effectively within and outside of aerospace engineering.
Level 1 Core Courses								
COMP1511 Programming Fundamentals	Developed			Developed	Developed	Developed		Developed
COMP1911 Computing 1A	Developed			Developed	Developed	Introduced		Introduced
DESN1000 Introduction to Engineering Design and Innovation	Introduced	Introduced			Developed	Developed	Developed	Developed
ELEC1111 Electrical Circuit Fundamentals	Developed	Introduced		Developed	Developed		Developed	
ENGG1300 Engineering Mechanics	Introduced	Introduced						Introduced
ENGG1811 Computing for Engineers	Developed			Developed	Introduced	Introduced		
MATH1131 Mathematics 1A	Developed	Developed		Developed	Developed	Developed		Developed
MATH1141 Higher Mathematics 1A	Developed	Developed		Developed	Developed	Developed		Developed
MATH1231 Mathematics 1B	Developed	Developed		Developed	Developed	Developed		Developed
MATH1241 Higher Mathematics 1B	Developed	Developed		Developed	Developed	Developed		Developed
MMAN1130 Design and Manufacturing		Introduced	Introduced	Introduced			Introduced	Introduced
PHYS1121 Physics 1A	Developed	Developed		Developed	Developed		Developed	Developed
PHYS1131 Higher Physics 1A	Developed			Developed	Developed		Developed	Developed
Level 2 Core Courses								
DESN2000 Engineering Design and Professional Practice			Developed		Developed	Developed	Proficient	Proficient
ENGG2400 Mechanics of Solids 1		Developed						
ENGG2500 Fluid Mechanics for Engineers		Developed						
MATH2019 Engineering Mathematics 2E	Developed			Developed				
MATH2089 Numerical Methods and Statistics	Developed			Developed				

MMAN2300 Engineering Mechanics 2		Developed						Developed
MMAN2700 Thermodynamics		Developed						
Level 3 Core Courses								
AERO3110 Aerospace Design 1		Developed	Developed	Developed	Developed	Developed		Developed
AERO3410 Aerospace Structures			Developed	Proficient	Proficient	Developed	Developed	Developed
AERO3630 Aerodynamics		Developed		Developed	Developed			Developed
AERO3660 Flight Performance and Propulsion		Developed		Developed				
DESN3000 Strategic Design Innovation			Developed		Developed	Developed	Proficient	Proficient
MMAN3200 Linear Systems and Control		Developed		Developed				
Level 4 Core Courses								
AERO4110 Aerospace Design 2			Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
AERO4620 Dynamics of Aerospace Vehicles, Systems and Avionics			Proficient	Proficient	Proficient			
Thesis Courses								
MMAN4951 Thesis A			Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
MMAN4952 Thesis B		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
MMAN4953 Thesis C		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
Recommended Discipline Electives								
AERO9500 Space Systems Architectures and Orbits	Proficient	Proficient	Proficient	Developed	Introduced	Developed	Introduced	Introduced
AERO9610 The Space Segment	Proficient	Introduced	Proficient	Developed	Developed	Proficient	Introduced	Introduced
AERO9660 Advanced Aerospace Propulsion		Proficient	Proficient	Proficient	Proficient	Proficient		
ENGG3741 Introduction to Nuclear Engineering	Proficient	Developed	Proficient	Developed	Developed	Developed	Proficient	Developed
MECH4305 Fundamental and Advanced Vibration Analysis	Proficient	Proficient	Developed	Developed	Introduced			Developed
MECH4320 Engineering Mechanics 3								
MECH4620 Computational Fluid Dynamics	Developed	Developed		Developed	Developed	Developed		
MECH4900 Mechanics of Fracture and Fatigue		Developed	Developed	Proficient				
MECH9420 Composite Materials and Mechanics	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
MMAN4200 Additive Manufacturing	Introduced	Developed		Developed	Developed	Developed	Developed	Developed
MMAN4400 Engineering Management		Developed	Developed	Developed	Developed	Developed	Proficient	
MMAN4410 Finite Element Methods	Developed	Proficient		Proficient			Proficient	Proficient
MMAN9350 Digital and Artificial Intelligence Technologies for Engineering Applications	Developed	Developed		Proficient	Developed	Developed	Developed	

Discipline Electives								
COMP3331 Computer Networks and Applications	Developed	Developed	Proficient	Proficient	Proficient	Developed	Developed	
ENGG2600 Engineering Vertically Integrated Project	Introduced	Developed	Introduced	Developed			Developed	Developed
ENGG3001 Fundamentals of Humanitarian Engineering		Developed	Developed		Developed	Developed	Proficient	Proficient
ENGG3060 Rehabilitation and Assistive Technology		Proficient		Developed	Proficient	Proficient	Proficient	Proficient
ENGG3600 Engineering Vertically Integrated Project	Developed	Proficient		Developed	Proficient	Proficient	Proficient	Proficient
ENGG4600 Engineering Vertically Integrated Project	Developed	Proficient		Developed	Proficient	Proficient	Proficient	Proficient
ENGG4841 Systems Engineering Fundamentals								
MANF4430 Reliability and Maintenance Engineering		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	
MANF4611 Process Modelling and Simulation	Developed	Developed		Proficient	Proficient	Developed		
MANF6860 Strategic Manufacturing Management		Introduced	Introduced			Introduced	Introduced	Introduced
MANF9400 Industrial Management					Introduced			Introduced
MANF9420 Operations and Supply Chain Management in Engineering		Introduced	Introduced	Introduced	Introduced	Introduced	Introduced	Introduced
MANF9472 Production Planning and Control								
MECH4100 Mechanical Design 2		Proficient		Proficient	Proficient	Proficient	Proficient	Proficient
MECH4770 Fundamentals and Design of Electrochemical Energy Storage Systems		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	
MECH4880 Refrigeration and Air Conditioning 1		Developed		Developed	Developed	Developed	Developed	
MECH9325 Fundamentals of Acoustics & Noise		Proficient	Proficient	Proficient	Developed	Developed	Developed	
MECH9650 Applied Bio and Microfluidics	Developed	Developed		Developed	Developed	Proficient	Proficient	Proficient
MECH9720 Solar Thermal Energy Design	Developed	Developed	Developed	Introduced	Introduced			Developed
MECH9761 Automobile Engine Technology	Developed	Proficient	Developed	Developed	Proficient	Proficient	Proficient	Proficient
MTRN4231 Robotics Project	Developed	Developed		Developed	Proficient	Developed	Developed	Developed
MTRN9400 Control of Robotic Systems	Introduced				Introduced	Introduced		
SOLA5052 Bioenergy and Renewable Fuels	Developed	Proficient		Developed	Developed	Proficient	Proficient	
SOLA5053 Wind Energy Converters	Developed	Proficient		Proficient	Proficient	Proficient	Proficient	
SOLA5056 Sustainable Energy for Developing Countries		Developed	Developed	Developed	Developed	Proficient	Proficient	Proficient
SOLA5057 Energy Efficiency		Developed		Proficient	Proficient	Proficient	Proficient	Proficient

7. Assessments

A complete overview of the assessment types is provided in Figures 1-3. Figure 1 shows assessment distribution for all specialisation courses, while Figures 2 and 3 show assessment distribution for core and elective courses, respectively.

Analysis of assessment distribution in core courses (Figure 2) reveals a strong reliance on invigilated/secure components. Tests (21.48%) and Examinations (20.00%) combined make up 41.48% of the assessment load, ensuring rigorous individual verification of complex aerospace concepts. Lab work (11.85%) reflects the critical importance of experimental aerodynamics and flight mechanics. Assignments (15.56%) and Reports (10.37%) provide balance for detailed analysis.

Analysis of assessment distribution in elective courses (Figure 3) shows a distinct shift towards design and research. Assignments (29.17%) are the dominant form of assessment, supported by Reports (11.11%) and Projects (9.72%). This distribution supports the elective specialisation's focus on advanced topics such as Space Systems, Composite Materials, and Computational Fluid Dynamics, which require extended, non-invigilated work to master.

The thesis pathway (MMAN4951/4952/4953) scaffolds independent research and professional work, with students demonstrating progressive capability through draft chapters, literature reviews, methodology reports, and final thesis documents. These courses provide extensive formative feedback through regular supervisor meetings and milestone reviews.

Reflective practice and peer assessment are embedded throughout the program to develop metacognitive awareness and critical evaluation skills. The School has implemented many processes to ensure that academic integrity is maintained:

- All exam papers are reviewed by another academic, along with worked solutions.
- Online exams use as much randomisation as practically possible for the question type (question banks, numerical input randomisation and in some cases multiple parallel versions of questions with slightly different solution paths). Post-COVID online assessments are generally discouraged throughout all courses in the school to guarantee academic integrity.
- For many exam-style assessments, pen and paper answers are uploaded to Moodle via an ExamScan process managed by faculty. This improves marking procedures, especially when done at scale in large courses.
- In-person lab activities have been centre stage in our program and have been increased substantially as our programs have moved back to in-person face-to-face delivery modes.
- Academics are encouraged to include open-ended elements in all their examination questions, with students answering short essay-style questions. This enables the marker to check the alignment between simple answers and comprehension.
- Reports are submitted using TurnItIn, which ensures that students are not plagiarising or colluding, but does not deter some forms of contract cheating.
- Model report/assignment rubrics have been provided to reward open-ended and creative solutions by students to discourage collusion and contract cheating. These have shown some initial promise, but much more evaluation and testing are required.
- Important works, such as thesis, have two (or three) markers to ensure consistency.

- Some courses have taken on viva-style assessments for all students, but these have proved challenging at scale without centralised support for scheduling.

Figure 1. Percentage of assessment types used within the specialisation.

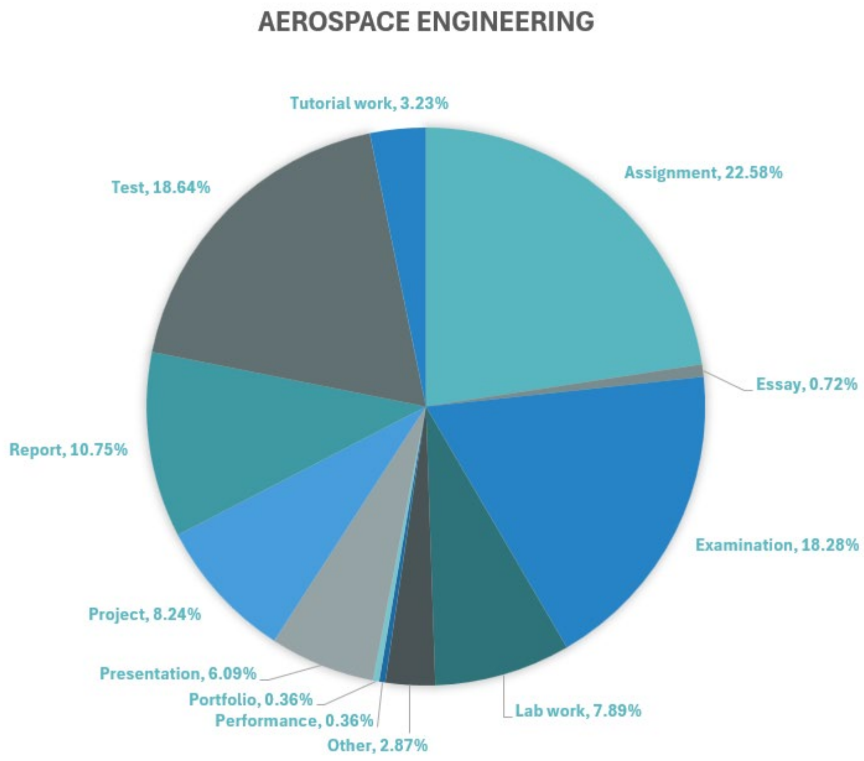


Figure 2. Percentage of assessment types used within the core of the specialisation.

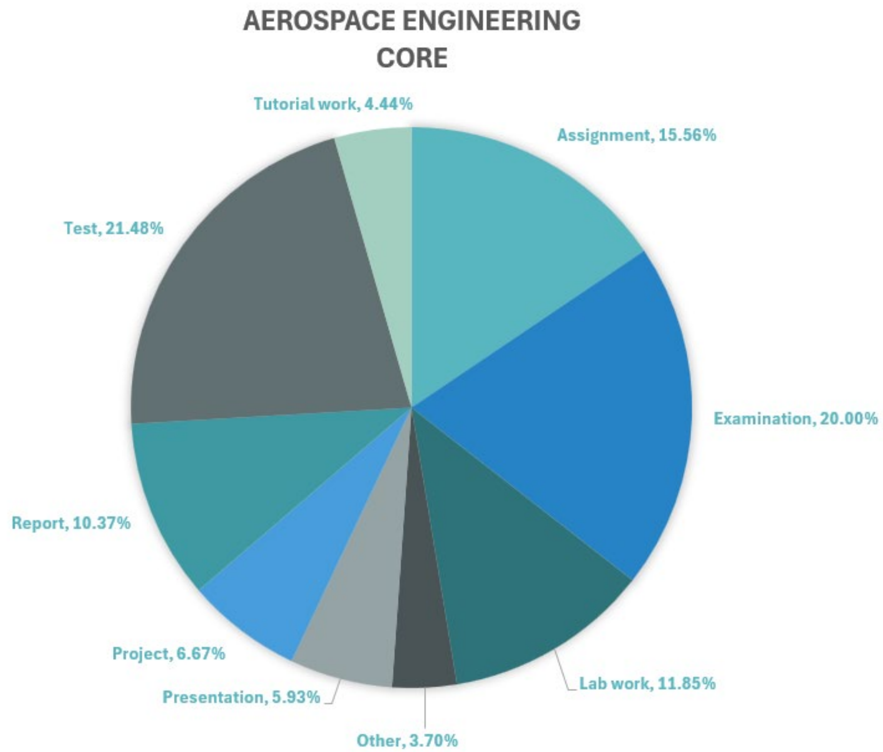
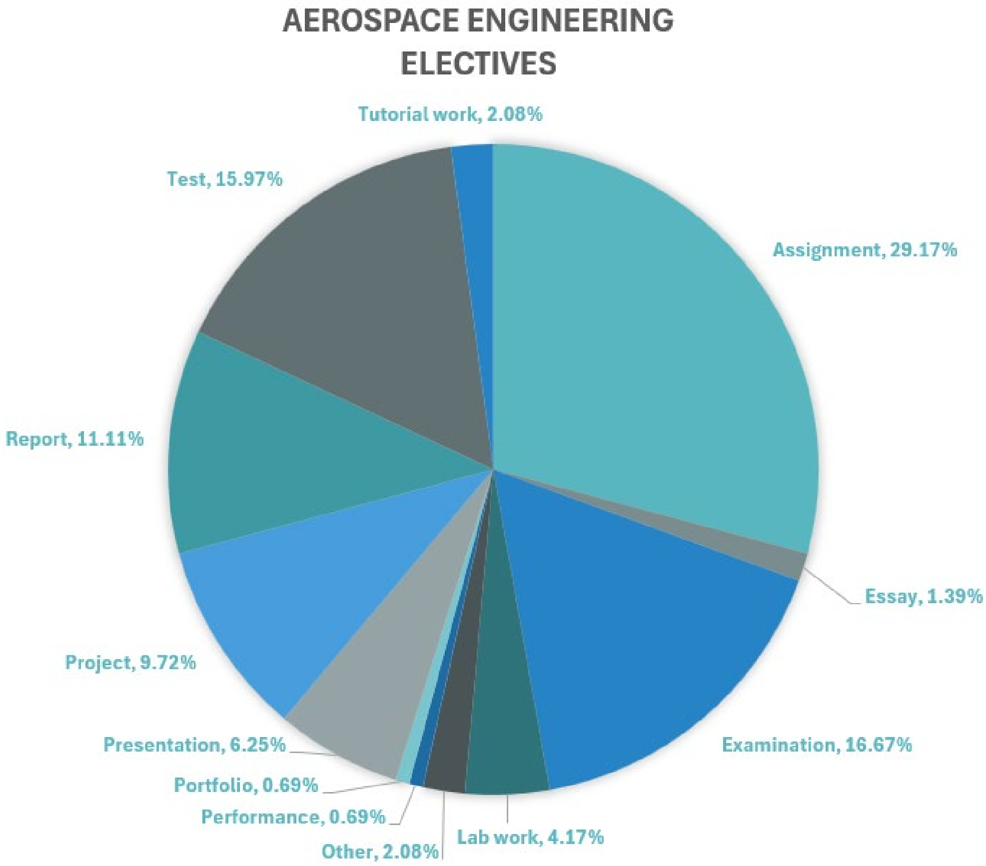


Figure 3. Percentage of assessment types used within the electives of the specialisation.



8. Specialisation Progression Plan

The specialisation plan for BE (Hons) Aerospace is shown. The plan is based on a default student progression, with commonly chosen electives. Course codes and names are shown in the tables, including a list of elective options. The UNSW trimester delivery offers students significant flexibility in the scheduling of many courses.

The structure of the AEROAH specialisation ensures that graduate-level capabilities are developed through science and programming courses in Year 1, core courses in Years 2 and 3, and specialised knowledge in Aerospace Design, Aerodynamics, and Systems in Year 4. This scaffolding approach allows students to reflect on their learning, enabling them to self-assess and develop graduate capabilities aligned with their interests or career aspirations.

To this end, students are supported in monitoring and adjusting their study progress through UNSW's official advising channels. Program information and enrolment support are provided through The Nucleus: Student Hub. Specialisation-specific level support is provided by designated year advisors whom the School appoints. A study plan specific to each term entry and a progression checklist is provided to the student. In addition, the myPlan online tool combines the study plans progression checklist into a single interactive tool that allows students and staff to schedule courses, view prerequisites, and track progress toward graduation in real time.

Each term, students use myPlan to confirm which requirements they have completed, which remain, and which prerequisite sequences apply, which supports self-checking of readiness for later-stage courses and informed elective selection.

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]