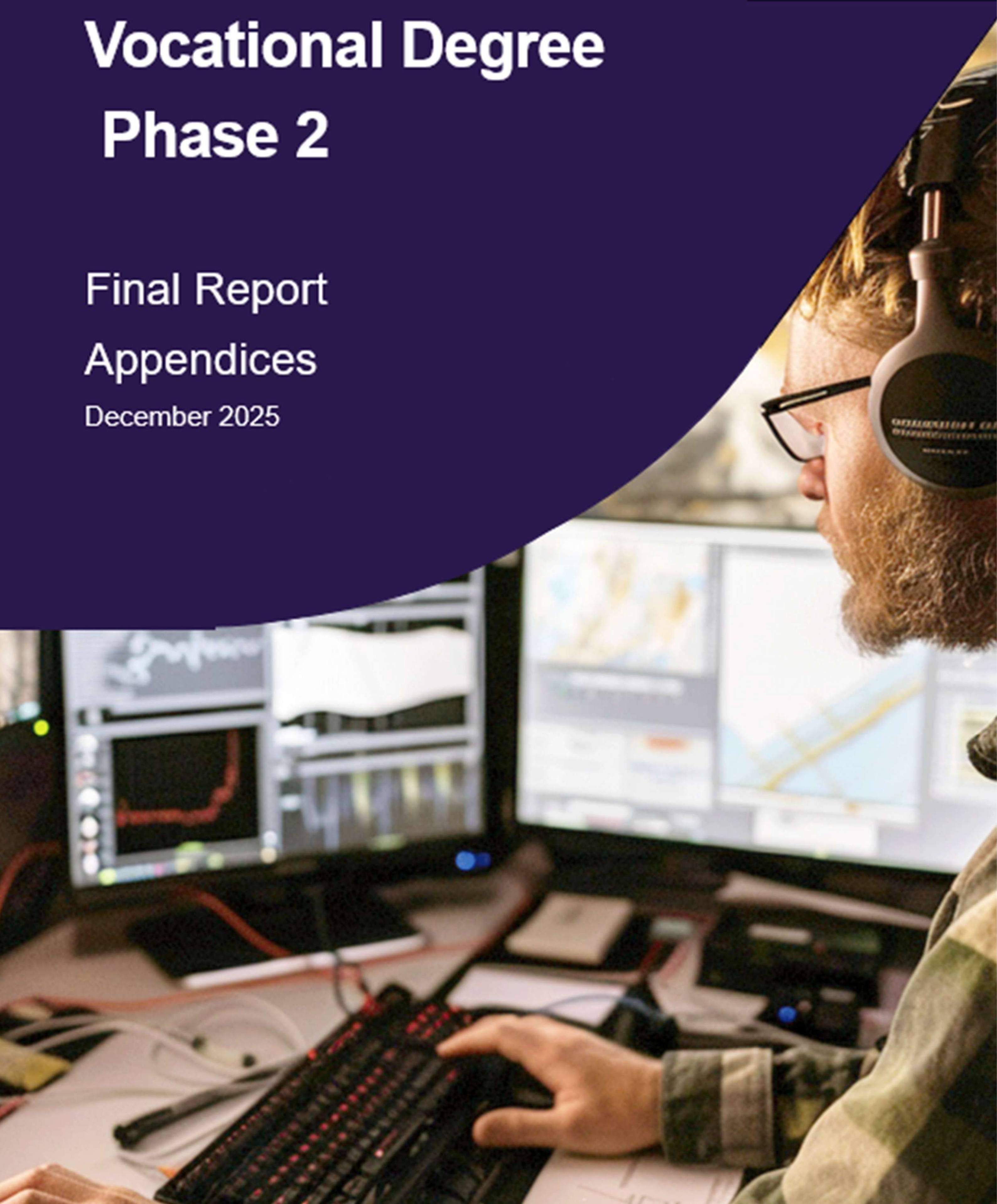
Mining and Automotive Skills Alliance

Vocational Degree Phase 2

Final Report

Appendices

December 2025



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Appendix 1 – Consultation Schedule

Week commencing	Primary focus and purpose	Audience	Owner	Outputs for gates and reporting
Meyvn / AUSMASA				
18 Aug	Internal kick off, confirm scope, roles, risk register set up	Meyvn, AUSMASA	Meyvn, AUSMASA, PMO	Project plan baseline, risk register v1, consultation calendar
Weekly	Internal status meeting	Meyvn, AUSMASA	Meyvn, AUSMASA, PMO	Status note, risk update
18 Aug	Stakeholder invitations for committeees	AUSMASA, Meyvn	Meyvn, AUSMASA PMO	Stakeholder list and invitations sent
20 Oct	Prepare interim report	AUSMASA	Meyvn	Draft interim report
01 Dec	Draft final report, recommendations and Phase 3 pathway	AUSMASA / DEWR	Meyvn	Draft final report
15 Dec	Finalise report pack and handover	AUSMASA / DEWR	Meyvn	Final scoping and recommendations report, 19 Dec submission
Steering Committee				
10 Sep	Project kick off, terms of reference, expectations, status and risks, seek direction.	Steering Committee	Meyvn, AUSMASA PMO	Kick off pack, approved ToR, decision log created, Consultation Calendar
6 Oct	Present draft structure and outcomes	Steering Committee	Meyvn, AUSMASA PMO	Gate B agreement to proceed to external validation
27 Oct	Endorse the interim report	Steering Committee	Meyvn, AUSMASA PMO	Interim report endorsed for 31 Oct submission
17 Nov	Confirm IR settings and feasibility direction	Steering Committee	Meyvn, AUSMASA PMO	Direction recorded, risks noted

Week commencing	Primary focus and purpose	Audience	Owner	Outputs for gates and reporting
8 Dec	Endorse final recommendations	Steering Committee	Meyvn, AUSMASA PMO	Endorsement minutes
Discipline Panel				
10 Sep	Project kick off, terms of reference, expectations, confirm discipline focus, and functional analysis.	Discipline Panel	Meyvn, AUSMASA PMO	Evidence map for Step 1 Functional Analysis Draft, Consultation Calendar
22 Sep	Functional Analysis, Qualification Purpose, Structure options, volume of learning	Discipline Panel	Meyvn	Functional Analysis, draft purpose statement, Structure options shortlist
29 Sep	Draft graduate outcomes and streams	Discipline Panel	Meyvn	Draft graduate outcomes, specialisation map
20 Oct	Validation feedback	Discipline Panel	Meyvn	Structure and outcomes, revised
3 Nov	WIL settings and potential assessment approach	Discipline Panel	Meyvn	Work integrated learning outline, assessment approach
1 Dec	Discipline Panel 7, peer review of final structure and outcomes	Discipline Panel	Meyvn	Technical peer review record
Stakeholder Interviews				
8 Sep	Stakeholder interviews, classification validation	Employers, unions	Meyvn	Interview notes, issues log
15 Sep	Equity session regional and Aboriginal and Torres Strait Islander stakeholders	Equity stakeholders	Meyvn	Equity considerations summary

Week commencing	Primary focus and purpose	Audience	Owner	Outputs for gates and reporting
22 Sep	Industry validation workshop 1, test discipline focus and outcomes	Employers, peaks	Meyvn	Validation themes, changes list
13 Oct	Data custodians session, data quality and availability	DEWR, JSA data teams	Meyvn	Data sources agreed, gaps recorded
13 Oct	Industry validation, graduate profile and job role alignment	Employers, licensing bodies	Meyvn	Role alignment map
13 Oct	Equity session feedback on structure and support needs	Equity stakeholders	Meyvn	Equity plan inputs
3 Nov	Industrial relations consultations awards and classification mapping	Unions, employer associations, IR specialist	Meyvn	IR brief v1, adoption conditions list
10 Nov	Provider feasibility, Centres of Excellence and target RTOs	RTOs, Centres of Excellence	Meyvn	Feasibility findings v1, interest statements
17 Nov	Industrial relations consultations test adoption conditions	Unions, employers	Meyvn	IR brief v2, agreed conditions where possible
24 Nov	Final validation sessions, consolidate all feedback	Panel chairs, key stakeholders	Meyvn	Validation log, change register closed

Appendix 2 – Functional Analysis – Reliability Engineer, Version 7

This table details the key functions of the Reliability Engineer role and their application in the workplace. By aligning functions to Vocational Degree outcomes, the table highlights how applied knowledge, cognitive and technical analysis, practical application, communication, compliance, and collaboration skills are developed for the role, reflecting reliability practice. The last three columns of the table reflect content that may be included in a teaching and learning pathway to achieve a qualification.

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
Vocational Degree Criteria 1: Broad and Coherent Applied Knowledge				
Function 1: Reliability Engineering Conduct failure mode analysis (FMEA) to predict failure modes of components and processes. Optimise component and system uptime through the use of reliability-centred maintenance (RCM).	• Perform Failure Mode and Effects Analysis (FMEA) to determine possible failure modes of both components and processes of a system that could lead to downtime.	• Knowledge of structured FMEA methodology, criticality analysis, and ranking systems • Understanding of component and process failure mechanisms in industrial systems • Awareness of applied FMEA use cases in asset-intensive industries	• Apply FMEA frameworks to identify and rank potential failure modes • Document FMEA findings and link them to maintenance/test plans • Facilitate cross-disciplinary FMEA workshops	• Exposure to cross-functional FMEA workshops in operational environments • Hands-on use of FMEA templates and criticality matrices • Experience applying FMEA outcomes to real-world maintenance strategies
	• Conduct risk assessments based on the outcome of FMEA and knowledge of wider systems to determine if potential failures pose additional risk to personnel or equipment.	• Knowledge of qualitative, quantitative, and semi-quantitative risk assessment methods • Understanding of safety-critical risk management frameworks • Knowledge of operational risk categories in mining and heavy industries	• Perform risk assessments informed by FMEA findings • Incorporate likelihood and consequence factors into risk ranking • Identify risks to personnel and equipment from potential failure modes	• Exposure to operational risk workshops and hazard reviews • Hands-on experience applying probabilistic risk assessment (PRA) techniques • Participation in site-based risk evaluations tied to FMEA outputs
	• Create risk mitigation plans and implement engineering fixes to ensure the continued safe operation of assets.	• Knowledge of engineering risk mitigation strategies and reliability improvement methods • Understanding of corrective and preventive action planning frameworks • Awareness of applied RCM in asset-intensive industries	• Develop risk mitigation plans integrated with asset management strategies • Implement engineering solutions to address identified risks • Document and communicate mitigation and corrective actions across stakeholders	• Exposure to implementing engineering fixes in response to risk assessments • Hands-on experience applying mitigation strategies to operational assets • Participation in asset reliability reviews and continuous improvement cycles
	• Utilise Reliability Block Diagrams (RBD) and other graphical methods to identify shortcomings of system redundancy and develop maintenance plans accordingly.	• Knowledge of reliability block diagrams and graphical modelling methods • Principles of redundancy and system design optimisation	• Construct RBDs to model system reliability and redundancy • Analyse system vulnerabilities and propose redundancy improvements	• Exposure to RBD modelling tools applied in industry projects • Hands-on practice with reliability software (e.g., Reliasoft, MATLAB) • Participation in maintenance planning based on RBD insights

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Awareness of maintenance planning practices informed by reliability models	• Translate model outputs into actionable maintenance strategies	
Function 2: Asset Strategy, Lifecycle Management and Sustainability Implement reliability strategies and sustainable processes as part of wider asset life cycle approach.	• Utilise operational data to verify that components are meeting their expected lifespan.	• Knowledge of data analytics methods for asset health monitoring • Understanding of lifecycle performance benchmarks and degradation modes • Awareness of site-based data collection practices for asset monitoring	• Analyse operational datasets to confirm component life assumptions • Identify deviations in expected vs. actual performance • Communicate insights for maintenance strategy adjustments	• Exposure to CMMS and asset performance data in live environments • Hands-on analysis of operational datasets for lifecycle validation • Experience presenting component lifespan findings to asset managers
	• Develop lifecycle cost and total cost of ownership models for equipment.	• Knowledge of cost modelling principles including Net Present Value (NPV) and LCC • Understanding of maintenance and replacement cost structures • Awareness of cost modelling tools used in industry asset management	• Build lifecycle cost and total cost of ownership (TCO) models • Integrate maintenance and replacement strategies into cost projections • Communicate cost-benefit outcomes to decision makers	• Exposure to lifecycle costing exercises in mining and industrial projects • Hands-on development of cost models in spreadsheets/software • Participation in financial reviews of asset lifecycle decisions
	• Implement assumptions on component and system lifespans into maintenance plans.	• Knowledge of maintenance planning frameworks and lifecycle integration • Understanding of reliability-centred maintenance (RCM) processes • Awareness of site-based practices for lifespan-driven maintenance	• Translate component/system lifespan assumptions into maintenance schedules • Develop preventive maintenance tasks aligned to lifecycle predictions • Adjust plans based on operational realities and environment	• Exposure to RCM-based maintenance planning workshops • Hands-on implementation of lifecycle-driven maintenance in CMMS • Experience linking lifespan data to site-level maintenance strategies
	• Utilise operational data to plan for component end-of-life and replacement before failures result in machine down time and excessive operational costing.	• Knowledge of predictive maintenance and end-of-life modelling methods • Understanding of failure modes leading to unplanned downtime • Awareness of operational cost impacts of asset failures	• Analyse operational data to forecast component end-of-life • Develop proactive replacement plans based on risk and cost impacts • Communicate replacement schedules to operations teams	• Exposure to predictive maintenance tools and data analysis • Hands-on experience forecasting and scheduling proactive replacements • Participation in replacement planning meetings with stakeholders

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Consider environmental risks of chemicals and processes utilised in machine maintenance works and develop mitigation strategies.	• Knowledge of environmental risk management principles and ISO standards • Understanding of chemical spill trendlines, handling and disposal requirements • Awareness of sustainability frameworks in heavy industries • Understanding of inspection and test plan requirements and quarantine processes	• Identify and assess environmental risks in maintenance processes • Analyse and interpret chemical spill data to identify trends and implement improved handling, containment and disposal practices • Develop mitigation strategies for chemical and process risks • Implement environmentally sustainable work practices • Interpret ITPs and quarantine records to verify compliance and environmental risks	• Exposure to environmental audits and risk assessments • Experience reviewing chemical spill records, contributing to incident investigations, and implementing updated control and disposal procedures • Experience implementing mitigation measures in maintenance activities • Experience reviewing ITPs and quarantine reports, contributing to corrective actions.
	• Implement sustainability focused reliability solutions such as recyclable/ serviceable components.	• Knowledge of sustainable design and circular economy principles • Understanding of lifecycle extension through serviceable components • Knowledge of legal requirements and practices for recycling and re-use in industrial environments	• Integrate legal and organisational requirements into recycling and re-use strategies to optimise sustainability and compliance outcomes • Identify opportunities for recyclable or serviceable component use • Support the implementation and provide supplier assurance for sustainable materials and components	• Experience developing and reviewing recycling and waste-management practices to meet legal and organisational requirements • Exposure to projects trialling recyclable/serviceable parts • Hands-on evaluation of components for serviceability and reuse • Experience applying circular economy practices to asset strategies
	• Develop sustainable operating strategies that reduce power consumption and undue machine wear.	• Knowledge of energy efficiency and sustainable operating principles • Understanding of degradation drivers linked to operating practices • Awareness of sustainability initiatives in operations	• Analyse operating practices to identify energy and wear inefficiencies • Develop strategies for sustainable operations • Communicate energy-saving and wear-reducing practices to operators	• Exposure to energy efficiency programs in industrial operations • Hands-on implementation of operating strategies to reduce wear • Participation in sustainability-focused operational planning
Vocational Degree Criteria 2: Cognitive and Technical Analysis Skills				
Function 3: Root Cause Analysis (RCA)	• Conduct thorough inspections of failed components and coordinate third-party metallurgical and chemical analysis.	• Knowledge of failure modes in mechanical, electrical, and chemical systems	• Inspect failed components using structured RCA approaches	• Exposure to field inspections of failed components

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
Lead investigations into failure events using techniques such as 5 Whys, Fishbone, and fault tree analysis.		• Understanding of metallurgical and chemical analysis methods • Awareness of third-party laboratory testing and industry practices	• Coordinate third-party lab testing for metallurgical/chemical analysis • Interpret and integrate external lab findings into RCA	• Hands-on coordination with third-party testing labs • Experience integrating metallurgical/chemical test results into RCA reports
	• Conduct structured interviews post-failure with maintenance personnel and operators who may have been involved at the time of failure.	• Knowledge of structured interview techniques and human factors in failures • Understanding of communication frameworks for post-failure investigations • Awareness of cultural and organisational dynamics in maintenance operations	• Conduct structured post-failure interviews with maintenance and operations staff • Document witness/operator insights accurately and impartially • Identify human factor contributions to failure events	• Exposure to structured interviews as part of failure investigations • Hands-on participation in human factor assessments post-failure • Experience contributing operator/maintenance perspectives into RCA
	• Lead failure analysis discussion exercises with project stakeholders, presenting data/ findings from investigations.	• Knowledge of RCA facilitation methods (5 Whys, Fishbone, FTA) • Understanding of stakeholder engagement and communication strategies • Awareness of collaborative practices in multidisciplinary RCA reviews	• Facilitate failure analysis discussions with cross-functional teams • Present investigation findings using evidence-based RCA outputs • Guide collaborative identification of corrective actions	• Exposure to stakeholder workshops for failure investigations • Hands-on experience facilitating multidisciplinary RCA sessions • Participation in reporting and presenting failure investigation findings
	• Document findings and recommend corrective actions/process changes, and engineering fixes to prevent the same failure from occurring again.	• Knowledge of corrective action planning frameworks • Understanding of documentation standards for RCA reporting • Awareness of continuous improvement practices in reliability engineering	• Draft RCA reports with findings, corrective actions, and recommendations • Recommend engineering fixes and process improvements • Communicate corrective action plans to site stakeholders	• Exposure to corrective action planning in industrial contexts • Hands-on preparation of RCA reports and recommendations • Experience embedding corrective actions into maintenance/test systems
Function 4: Data Collection & Analysis Gather, interpret and report data from tests, sensors, and operational environments to support decision-making.	• Capture operational and test data via SCADA or PLC outputs and process the captured data so that it can be used for diagnostics and fault-finding purposes.	• Knowledge of SCADA/PLC data systems and industrial communication protocols • Understanding of diagnostic data processing and condition monitoring principles • Awareness of applied practices for capturing and using operational data	• Capture and process operational/test data from SCADA/PLC systems • Prepare data for use in diagnostics and troubleshooting • Integrate captured data into maintenance workflows	• Exposure to capturing and processing SCADA/PLC data in operational contexts • Hands-on experience using diagnostic tools and monitoring platforms • Participation in troubleshooting activities informed by real-time data

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Utilise data anomalies to predict potential failures.	• Knowledge of anomaly detection methods in time-series and operational data • Understanding of predictive maintenance models and failure prediction principles • Awareness of industry examples using anomalies for pre-emptive fault detection	• Detect anomalies in datasets to predict failure modes • Validate anomaly findings with equipment performance • Report anomalies to maintenance teams for pre-emptive action	• Exposure to anomaly detection case studies in reliability projects • Hands-on use of anomaly detection methods in predictive maintenance • Participation in maintenance planning using anomaly-based insights
	• Use coding tools like Minitab, MATLAB, and Python for data analysis and automation of database queries (SQL).	• Knowledge of statistical analysis and coding tools (Minitab, MATLAB, Python, SQL) • Understanding of automation for database queries and data pipelines • Awareness of coding applications in maintenance and test engineering	• Use Minitab, MATLAB, and Python for statistical and engineering analysis • Automate data queries using SQL and coding techniques • Develop scripts for analysis of large operational datasets	• Exposure to coding and analysis in engineering test environments • Hands-on use of Minitab, MATLAB, and Python for operational data • Experience with SQL queries for automating database analysis
	• Analyse data, recognising and reporting on patterns and trends in the data as key indicators of asset health.	• Knowledge of data analysis methods for trend recognition (Statistical Process Control (SPC), regression, time-series) • Understanding of asset health indicators and Kry Performance Indicator (KPI) frameworks • Awareness of industry practices linking trend data to decision-making	• Identify and report trends in asset health through data analysis • Apply SPC and regression analysis to detect degradation • Communicate asset health insights to stakeholders	• Exposure to trend analysis for asset health monitoring • Hands-on application of SPC/time-series methods for data sets • Participation in reporting asset health trends to stakeholders
	• Utilise the data to pre-empt machine failures and put maintenance and rectification plans in place.	• Knowledge of failure prediction, reliability modelling, and preventive maintenance • Understanding of how data insights feed into proactive maintenance strategies • Awareness of industry adoption of predictive analytics for machine health	• Translate data insights into preventive maintenance actions • Develop rectification strategies informed by predictive models • Collaborate with operations to implement maintenance changes	• Exposure to predictive maintenance systems in field operations • Hands-on practice linking predictive data to rectification plans • Experience implementing data-driven maintenance adjustments
	• Locate key system information such as specifications and setpoints in drawings, supplier documentation and existing maintenance logs to assist in and	• Knowledge of technical documentation, system specifications, and engineering drawings	• Extract specifications and setpoints from technical drawings and documents	• Exposure to use of supplier documentation and drawings in troubleshooting

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	troubleshooting system issues, Failure analysis and process adjustments	• Understanding of how design and supplier data informs troubleshooting • Awareness of maintenance record-keeping practices in industry	• Use supplier documentation and maintenance logs for troubleshooting • Incorporate historical data into failure analysis and process improvements	• Hands-on application of extracting key information from technical sources • Participation in maintenance investigations using historical data
Function 5: Technology Utilisation and Research Conduct technical research to identify potential product and/or process improvements through new and emerging technologies.	• Conduct research into new and emerging diagnostic technologies, materials and coatings that could improve process efficiency and system reliability.	• Knowledge of diagnostic technologies, advanced materials, and protective coatings • Understanding of how emerging technologies improve process efficiency and reliability • Awareness of industry adoption of new technologies in mining and heavy industry	• Evaluate new diagnostic technologies and materials for applicability • Assess coatings for durability and efficiency improvements • Prepare reports summarising potential technology benefits	• Exposure to projects trialling new diagnostic technologies and coatings • Hands-on evaluation of prototype technologies in industrial settings • Participation in industry workshops on advanced materials
	• Identify technical shortcomings and assess readily available solutions that can be implemented.	• Knowledge of gap analysis and technical benchmarking methods • Understanding of readily available engineering solutions and retrofit options • Awareness of industry practices for assessing technology shortcomings	• Identify gaps in current systems and processes • Research and propose feasible engineering solutions • Conduct feasibility assessments for rapid adoption	• Exposure to gap analysis processes in maintenance/reliability projects • Hands-on assessment of retrofit engineering solutions • Experience validating off-the-shelf solutions in live operations
	• Collaborate with research institutions and suppliers in the development of new technologies.	• Knowledge of collaborative research frameworks and supplier partnerships • Understanding of technology readiness levels (TRLs) and validation processes • Awareness of partnerships between industry and research bodies	• • Collaborate with universities and suppliers to test emerging technologies • Contribute to joint development projects and trials • Communicate outcomes of collaborative trials to stakeholders	• Exposure to collaboration with suppliers and research partners • Hands-on participation in pilot studies and joint trials • Experience aligning research outcomes with operational needs
Vocational Degree Criteria 3: Application of Knowledge				
Function 6: Test Planning & Execution Develop and execute structured testing protocols for new and	• Utilise FMEA and past RCA studies as tools in creating requirements for ongoing testing as part of a systems-level approach to asset reliability.	• Knowledge of FMEA and RCA methodologies for system reliability improvement	• Integrate FMEA and RCA findings into test planning • Translate historical failure data into current testing requirements	• Exposure to linking FMEA/RCA outcomes to test campaigns • Hands-on experience applying RCA/FMEA to define test requirements

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
existing systems under simulated and real conditions.		• Understanding how historical failure analysis informs ongoing testing requirements • Awareness of applied case studies using FMEA and RCA in industry	• Facilitate systems-level reviews linking RCA/FMEA outcomes to test planning	• Participation in system-level reviews for ongoing reliability improvements
	• Design test plans with clear acceptance criteria and testing methods. Test data required should be called out in the test plan. Failure criteria should also be outlined in the test plan, with immediate remedial action suggested to prevent equipment damage.	• Knowledge of test planning frameworks and acceptance criteria development • Understanding of how to define failure thresholds and remedial actions • Awareness of industry practices in writing test plans	• Write test plans with clear acceptance and failure criteria • Define immediate remedial actions in case of equipment failure • Ensure traceability of test requirements to design and safety standards	• Exposure to preparing detailed test plans with acceptance/failure criteria • Hands-on writing and executing test plans • Experience implementing immediate remedial action procedures during tests
	• Set up instrumentation and data acquisition systems.	• Knowledge of sensors, Data Acquisition (DAQ) hardware/software, and calibration principles • Understanding of signal processing, accuracy, and noise reduction • Awareness of instrumentation practices in industrial test contexts	• Install, configure, and calibrate instrumentation and DAQ systems • Integrate sensors with PLC/SCADA systems for data acquisition • Verify data integrity and system operability before testing	• Hands-on setup of DAQ systems in prototype and field test environments • Exposure to commissioning processes requiring sensor/DAQ configuration • Experience troubleshooting instrumentation and data channels on site
	• Co-ordinate with site operations teams to facilitate the resourcing for conducting tests.	• Knowledge of site operations structures and resourcing requirements • Awareness of safety and compliance frameworks relevant to test execution • Understanding of logistics planning for testing in live industrial environments	• Engage with site operations to align test scheduling and resourcing • Plan for equipment, manpower, and site access needed for tests • Ensure test activities comply with operational standards and safety protocols (	• Exposure to site-based test execution requiring cross-team coordination • Hands-on experience organising resourcing for prototype/field tests • Participation in operational planning meetings before testing
	• Lead risk assessment exercises for conducting tests and suggest risk mitigation strategies.	• Knowledge of risk assessment methods (qualitative, quantitative, PRA) • Understanding of risk mitigation planning in testing contexts • Awareness of site-based risk management frameworks	• Facilitate risk assessment workshops specific to planned tests • Develop mitigation strategies for identified risks • Communicate risk outcomes and mitigations to stakeholders	• Participation in risk assessments for site testing activities • Hands-on application of PRA models to simulate test risks • Experience leading risk mitigation planning for live test environments

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Conduct environmental, stress, and lifecycle testing.	• Knowledge of environmental, stress, and lifecycle testing methodologies • Understanding of accelerated life testing (ALT) principles • Awareness of sustainability considerations in testing	• Perform environmental, stress, and lifecycle testing on assets • Document results of accelerated and lifecycle testing • Evaluate test findings for alignment with design expectations	• Exposure to conducting environmental and lifecycle tests in applied contexts • Hands-on execution of stress and accelerated life tests • Experience evaluating environmental test results for asset reliability
	• Consider and manage testing risks associated with the human factor, such as measurement error and operator inconsistency.	• Knowledge of human reliability analysis (HRA) and error modes • Understanding of measurement uncertainty and error propagation • Awareness of operator training and competency frameworks in testing	• Identify potential human factor risks in test execution • Design procedures and training to minimise operator variability • Implement cross-checking and redundancy to mitigate measurement errors	• Exposure to lessons-learned reviews highlighting human factor risks • Hands-on experience in calibrating instruments to reduce operator error • Participation in human factors risk assessments during test planning
Function 7: Continuous Improvement Drive improvements to product reliability, testing efficiency, and lifecycle performance through structured improvement initiatives.	• Track reliability KPIs (e.g. Mean Time Between Failures (MTBF), Mean Time To Repair (MTTR), failure rate).	• Knowledge of reliability KPIs such as MTBF, MTTR, and failure rate • Understanding of KPI calculation methods and statistical underpinnings • Awareness of applied KPI tracking practices in asset-intensive industries	• Calculate and track KPIs like MTBF, MTTR, and failure rate • Prepare reports on reliability performance for stakeholders • Communicate KPI results to operations and maintenance teams	• Exposure to KPI reporting in asset reliability projects • Hands-on practice calculating KPIs with real data • Participation in KPI review meetings with stakeholders
	• Contribute to Six Sigma or Lean reliability projects.	• Knowledge of Lean and Six Sigma methodologies (Define, Measure, Analyse, Improve, Control (DMAIC), SPC) • Awareness of industry adoption of Lean reliability programs	• Apply Lean/Six Sigma tools to reliability challenges • Lead or support reliability improvement projects	• Exposure to Lean/Six Sigma projects in asset-intensive industries • Hands-on application of DMAIC methods
	• Benchmark performance and identify production and process bottlenecks.	• Knowledge of benchmarking frameworks and comparative performance methods • Understanding of production flow and bottleneck analysis • Awareness of site-level practices for process benchmarking	• Conduct benchmarking studies against industry or internal peers • Analyse production data to identify bottlenecks • Communicate bottleneck findings and improvement needs to leadership	• Exposure to performance benchmarking exercises in operations • Hands-on experience analysing bottlenecks in production processes • Participation in benchmarking studies with peer organisations

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Define improvement targets and develop improvement plans to achieve them.	• Knowledge of target-setting frameworks and performance improvement strategies • Understanding of how to translate data insights into action plans • Awareness of management practices for continuous improvement	• Set realistic reliability and performance targets • Develop structured plans to achieve improvement targets • Facilitate team discussions to align around improvement goals	• Exposure to improvement target-setting workshops • Hands-on development of reliability improvement plans • Experience monitoring progress towards defined reliability goals
	• Take on feedback from operations and maintenance crews to improve ease of use and manage human factor risks that arise from procedural shortcuts.	• Knowledge of human factors in reliability and maintenance • Understanding of procedural compliance risks and shortcuts • Awareness of operational realities faced by crews in field environments	• Gather and incorporate feedback from operations and maintenance crews • Assess human factor risks arising from shortcuts • Recommend process improvements based on crew feedback	• Exposure to human factor issues identified in field operations • Hands-on experience incorporating crew feedback into reliability plans • Participation in discussions on reducing procedural risks
Function 8: Systems Integration & Digitalisation Integrate advanced computation and simulation methods to increase visibility of system reliability reduce the requirement of physical testing	• Utilise digital twin and hardware in the loop studies to identify and troubleshoot issues within system architecture. Where physical hardware may be at risk from conducting a real test.	• Knowledge of digital twin and HIL methods • Awareness of digital approaches replacing physical risk-heavy tests	• Build/apply digital twins for reliability analysis • Conduct HIL studies for risk mitigation	• Exposure to digital twin/HIL environments in industry • Hands-on troubleshooting using simulation environments
	• Utilise simulation and Computer-Aided Engineering (CAE) processes to assess potential failure modes in RCA studies.	• Knowledge of simulation methods and computer-aided engineering (CAE) tools • Understanding of integrating CAE results into RCA studies • Awareness of industry adoption of simulation in reliability contexts	• Perform simulation studies to assess failure modes • Integrate CAE outputs into structured RCA investigations • Develop reports linking simulation findings to system-level	• Exposure to CAE and simulation software in reliability projects • Hands-on use of simulation data in RCA investigations • Participation in workshops applying simulation tools to failure analysis
	• Utilise IoT strategies for condition monitoring to improve system reliability and visibility of machine performance.	• Knowledge of IoT systems, sensors, and data integration for condition monitoring • Understanding of reliability-focused IoT strategies for predictive maintenance • Awareness of real-world applications of IoT for asset monitoring	• Implement IoT-enabled condition monitoring systems • Use IoT data for predictive maintenance planning • Support teams in applying IoT insights for asset reliability	• Exposure to IoT deployment for asset monitoring • Hands-on experience integrating IoT sensor data into maintenance planning • Participation in projects implementing IoT reliability solutions

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Utilise AI driven reliability tools for failure pattern recognition and reporting purposes.	• Knowledge of AI and machine learning methods applied to reliability engineering • Understanding of algorithms for failure pattern recognition and predictive analytics • Awareness of case studies using AI-driven reliability tools	• Apply AI-based tools for detecting failure patterns • Automate reliability reporting using AI analytics • Communicate AI-driven insights for proactive maintenance planning	• Exposure to AI-driven reliability applications in field projects • Hands-on practice using AI analytics for failure recognition • Experience presenting AI-based reliability insights to leadership
Vocational Degree Criteria 4: Communication				
Function 9: Reporting & Documentation Produce technical reports, validation protocols, and recommendations for design or process improvements.	• Write detailed testing maintenance and testing plans.	• Knowledge of test and maintenance planning frameworks • Understanding of aligning maintenance/test plans with asset strategies • Awareness of industry practices in preparing detailed maintenance/testing plans	• Draft detailed maintenance and testing plans • Align maintenance/testing documentation with lifecycle requirements • Communicate testing requirements to site teams	• Exposure to drafting maintenance/testing plans in industrial projects • Hands-on experience aligning test plans to lifecycle goals • Participation in reviews of maintenance/testing documentation
	• Write Site Acceptance Test (SAT) plans.	• Knowledge of SAT frameworks and standards • Understanding of acceptance criteria for system validation • Awareness of applied SAT practices in commissioning	• Write SAT plans aligned with validation criteria • Define pass/fail conditions for acceptance testing • Coordinate SAT execution with site stakeholders	• Exposure to SAT planning and commissioning environments • Hands-on experience developing SAT criteria • Participation in SAT execution with multidisciplinary teams
	• Write test procedure documents.	• Knowledge of test procedure development principles • Awareness of applied documentation practices in reliability/testing	• Draft step-by-step test procedure documentation • Ensure consistency and compliance of test documentation	• Exposure to writing test procedure documentation • Hands-on preparation of procedural documents
	• Write technical reports, test summaries, and reliability predictions for the quality team.	• Knowledge of technical reporting and reliability prediction methods • Understanding of statistical reliability analysis for reporting • Awareness of reporting expectations for quality teams	• Prepare technical reports and test summaries • Perform reliability predictions using statistical tools • Deliver quality-focused reporting for stakeholder use	• Exposure to preparing technical reports and summaries • Hands-on preparation of reliability predictions • Experience reporting to quality teams
	• Maintain logs of component failure rates and generate failure maps.	• Knowledge of failure rate analysis method	• Maintain logs of failure events • Generate visual failure maps for trend analysis	• Exposure to maintaining failure logs and databases

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Understanding of component log management and failure mapping • Awareness of record-keeping practices for component reliability	• Use logs to support RCA and continuous improvement	• Hands-on generation of failure maps • Participation in component reliability analysis
	• Maintain testing logs as a tool for assisting with data analysis and troubleshooting activities.	• Knowledge of test logging and troubleshooting frameworks • Understanding of data structuring for test analysis • Awareness of applied testing documentation in maintenance contexts	• Maintain structured test logs during campaigns • Link test log data to troubleshooting processes • Support analysis by recording detailed test conditions	• Exposure to maintaining structured test logs • Hands-on practice linking logs to data • Experience using test logs to troubleshoot issues
	• Write RCA reports.	• Knowledge of RCA reporting standards and documentation frameworks • Understanding of structuring RCA findings into reports • Awareness of continuous improvement through RCA documentation	• Document RCA findings clearly in report format • Recommend corrective actions in RCA reports • Communicate RCA outcomes to relevant teams	• Exposure to RCA report writing in reliability projects • Hands-on drafting of RCA documentation • Participation in corrective action planning based on RCA outcomes
	• Write detailed component teardown and inspection reports.	• Knowledge of inspection and teardown documentation methods • Understanding of linking teardown findings to RCA outcomes • Awareness of applied practices in inspection reporting	• Write inspection and teardown reports • Link findings to engineering or RCA reports • Support lessons-learned activities through reporting	• Exposure to inspection/teardown documentation • Hands-on writing of teardown and inspection reports • Experience contributing to lessons-learned documentation
	• Present findings to engineering, quality, and executive teams.	• Knowledge of communication strategies for technical presentations • Understanding of tailoring reliability findings for different audiences • Awareness of cross-disciplinary communication in reliability engineering	• Prepare and deliver presentations to cross-functional audiences • Summarise technical results for executive stakeholders • Facilitate discussions of findings with engineering and quality teams	• Exposure to technical presentations in reliability projects • Hands-on presenting technical results to diverse audiences • Experience facilitating feedback sessions with executives/quality teams
	• Write detailed handover notes.	• Knowledge of documentation methods for project handovers	• Write clear and complete handover notes	• Exposure to writing handover notes for project closeout

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Understanding of traceability and continuity in handover reporting • Awareness of industry handover practices between project phases	• Ensure testing continuity through detailed documentation • Transfer knowledge effectively at project closeout	• Hands-on preparation of detailed documentation for handover • Experience ensuring continuity through detailed project records
Function 10: Standards & Compliance Ensure compliance with quality, safety, and performance standards (e.g. ISO, United States Military Standards (MIL-STD), AS/NZS)	• Interpret and apply relevant standards, particularly quality and asset management standards ISO-9001 and ISO-55000 and risk management standard AS-4024.	• Knowledge of ISO-55000 for asset management (RE focus) • Awareness of compliance practices in industry including ESG and ISO 14001	• Interpret and apply relevant standards to testing/reliability • Integrate asset management standards into reliability practice	• Hands-on experience applying ISO-55000 in asset-focused contexts
	• Locate and utilise application-specific standards such as AS-3000 for electrical installations.	• Knowledge of application-specific standards such as AS-3000 • Understanding of compliance requirements in specialised engineering domains • Awareness of applied compliance practices in industry	• Locate and apply application-specific standards • Integrate AS-3000 and similar standards into project plans • Support operations with compliance requirements in specialised areas	• Exposure to applying AS-3000 and domain-specific standards • Hands-on practice integrating standards into design/testing • Experience supporting compliance during audits
	• Apply engineering best practice for applications that are not specifically covered by a single standard.	• Knowledge of engineering best practices beyond formal standards • Understanding of how to apply general engineering principles to unique problems • Awareness of case studies requiring best practice applications in non-standardised areas	• Apply best practice engineering principles where standards are not specific • Evaluate solutions for alignment with general engineering best practice • Document best practice applications for continuous improvement	• Exposure to projects requiring best practice approaches in non-standard areas • Hands-on application of engineering judgement to fill standardisation gaps • Experience documenting best practices for lessons learned
	• Audit systems for compliance, ensuring systems and processes stay relevant as standards evolve.	• Knowledge of auditing frameworks for compliance • Understanding of how standards evolve and how to keep systems aligned • Awareness of industry audit and compliance	• Conduct compliance audits of systems and processes • Identify gaps in compliance and recommend updates • Support continuous alignment with evolving standards	• Exposure to auditing systems for compliance • Hands-on experience aligning systems with updated standards • Participation in compliance workshops or audits
	• Maintain document traceability for inspection and test records and procedures.	• Knowledge of document traceability systems and requirements	• Maintain traceable documentation for inspection and testing	• Exposure to document traceability systems

Workplace Focus		Teaching and Learning Focus		
Key Functions	**Reliability Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Understanding of how to maintain compliance records for inspection and testing • Awareness of documentation and record-keeping practices	• Develop record-keeping systems to support compliance • Communicate traceability requirements to operational teams	• Hands-on experience maintaining inspection/testing records • Experience contributing to compliance traceability reviews
Function 11: Cross-functional Collaboration Liaise with design, manufacturing, operations, and maintenance teams to ensure reliability objectives are integrated	• Participate in design reviews and change control boards.	• Knowledge of design review processes and change management frameworks • Understanding of cross-disciplinary communication during design reviews • Awareness of industry practices in design change governance	• Participate effectively in design review sessions • Contribute to discussions on change control and design modifications • Provide clear documentation of review outcomes	• Exposure to participating in design reviews and change boards • Hands-on involvement in design change assessments • Experience documenting and tracking design modifications
	• Support supplier assurance processes and interpret documentation to confirm compliance with organisational and contractual requirements.	• Knowledge of supplier assurance frameworks and reliability standards • Understanding of contractual and certification compliance requirements • Awareness of supplier performance monitoring processes	• Interpret and analyse supplier certificates of assurance, contracts and agreements for reliability, safety and environmental compliance • Provide assurance input and recommendations to internal stakeholders	• Exposure to supplier assurance reviews and compliance audits • Experience verifying supplier documentation and contributing to assurance reporting
	• Support commissioning and handover to operations.	• Knowledge of commissioning practices and handover frameworks • Awareness of cross-disciplinary involvement during handover	• Support commissioning validation activities • Prepare documentation to support handover	• Exposure to commissioning projects • Hands-on support during project handover
	• Work closely with external partners (OEM/customer organisations to develop effective upgrade packages and maintenance processes for equipment.	• Knowledge of collaboration frameworks with OEMs and customer organisations • Understanding of upgrade package design and maintenance planning • Awareness of external partnership models for reliability improvements	• Collaborate with OEMs to develop upgrade strategies • Support customers in implementing maintenance processes • Communicate effectively with external partners for reliability outcomes	• Exposure to collaboration with OEMs and customer organisations • Hands-on involvement in developing upgrade packages • Experience supporting the implementation of maintenance processes with partners

Appendix 3 – Qualification Structure

Vocational Degree in Reliability Engineering

This three-year program is an AQF Level 7 Vocational Degree in Reliability Engineering. The qualification is structured into capability themes that reflect real-world workplace functions, and learning is a mix of Training Provider-based and work-integrated learning (WIL), potentially in an employment context.

This applied approach aligns with the AQF 7 vocational degree descriptors by emphasising broad, coherent technical knowledge and complex problem-solving in an industrial context. It has strong industry backing for its focus on work-readiness, site-based learning, and co-designed content. The program also aligns with Engineers Australia's Stage 1 Engineering Technologist competencies (knowledge base, engineering application, and professional skills), preparing graduates for recognition as Engineering Technologists. Importantly, it also provides a pathway for experienced tradespeople (e.g., electricians, mechanics, condition monitoring specialists), with prior industry training and experience to be recognised, allowing them to enter at an appropriate stage without having to duplicate the fundamentals.

The Design Principles

The design principles articulate the core requirements that underpin the structure and purpose of the vocational degree. They ensure the qualification reflects industry expectations, supports applied professional practice, and meets the academic standards of AQF Level 7. These principles have guided all decisions during Phase 2 of the Vocational Degree project.

1. Work Integrated Learning as the Core Design Logic – workplace learning and assessment is integral to curriculum, assessment, and progression, not an additional component.
2. Occupational and Industry Alignment – the qualification is purpose built for a specific applied professional role, directly shaped by industry needs, job functions, and national priorities.
3. Applied Technical Capability for Modern Industrial Complexity – the qualification focuses on reliability and asset performance, including electrification, automation, digital systems, decarbonisation, advanced diagnostics, and systems integration, reflecting the complexity of modern industrial operations.
4. Evidence Based and Co Designed with Industry – design decisions are grounded in workforce data, functional analysis, and continuous engagement with employers, RTOs, regulators, Engineers Australia, unions, and professional bodies.
5. Integrated Cross Disciplinary Knowledge – learners develop capability across mechanical, electrical, digital, business and data domains to operate effectively in complex industrial environments.
6. Authentic Assessment Reflecting Real Work – assessment is applied, workplace based and aligned to the complexity of actual tasks undertaken in the role.

7. Accessible, Stackable, and Supportive Pathways – the qualification enables RPL, credit, modular progression, and learner support suitable for regional, FIFO, remote, and mid-career learners.

8. Equity, Inclusion, and Cultural Safety Embedded – the design supports diverse learners and ensures culturally safe, inclusive learning and assessment environments.

9. Provider and System Readiness within Workforce and Industrial Structures – delivery requires providers to demonstrate academic governance, technical expertise, industry partnerships, and access to work integrated learning and assessment settings. The qualification aligns with industrial relations and workforce structures so that award classifications, accreditation requirements, and workforce planning shape how learners enter, progress, and are recognised on completion

Graduate Profile

Graduates of the *Vocational Degree in Reliability Engineering* are applied professionals who combine engineering principles, diagnostic reasoning, and workplace experience to improve the reliability, safety, and performance of industrial assets. They draw on knowledge of real-world maintenance practices and engineering system behaviour to analyse failures, implement corrective actions, and optimise asset performance. Their applied approach integrates technical, digital, and organisational perspectives to achieve sustainable and reliable operations.

Graduates are typically employed as Reliability Engineers, Reliability Technologists, Asset Engineers, Testing and Validation Specialists, or Asset Performance Analysts within industries such as mining, manufacturing, transport, utilities, Defence and energy. They work autonomously and collaboratively in roles that require technical leadership, diagnostic capability, and the capacity to manage technical and organisational change across the asset lifecycle.

Graduate Outcome Statement

Graduates of the *Vocational Degree in Reliability Engineering* will be able to apply engineering, scientific, and financial principles to enhance the reliability, safety, and sustainability of complex industrial systems. They will integrate technical, digital, and organisational knowledge to lead improvement, manage change, and exercise professional judgement within multidisciplinary environments.

Graduates will be able to:

1. Apply and adapt engineering principles to design, test, and implement reliability and defect-elimination solutions based on broadly defined technical concepts, standards, and regulatory requirements.

2. Integrate field, laboratory, and digital data to diagnose performance issues, determine root causes, and inform system improvement, maintenance, and lifecycle planning.

3. Use systems thinking to analyse interdependencies across technical, operational, and organisational interfaces, anticipating the implications of innovation and change on people, processes, and performance.
4. Evaluate financial, risk, and sustainability factors in engineering decisions, preparing business cases and lifecycle cost analyses that support responsible investment and continuous quality improvement.
5. Communicate and collaborate professionally across multidisciplinary teams, using influence, facilitation, and structured communication to support the adoption of new reliability practices, technologies, and processes.
6. Lead and contribute to projects that apply reliability methodologies, testing programs, and digital tools to improve safety, efficiency, and organisational outcomes through managed change.
7. Demonstrate professional judgement, integrity, and accountability consistent with the standards of practice expected of an applied engineering technologist and reliability professional.

Core Units

Students will complete 20 Core Units.

Capability Theme	Year 1	Year 2	Year 3
Capability Theme 1: Engineering Foundations and Technical Communication Develops the foundational knowledge of materials, mechanics, and systems used in reliability engineering, alongside the ability to interpret technical documentation. Students apply engineering science and use technical drawings, OEM manuals, and standards to investigate and resolve equipment performance problems. They develop introductory proficiency in AutoCAD and related CAD platforms to read, annotate, and update engineering drawings, ensuring that documentation reflects current asset configurations and supports traceable maintenance and reliability records. This theme includes engagement with upstream engineering documentation and design intent, supporting early influence on system reliability through collaborative design reviews and interpretation of lifecycle parameters.	Potential Unit: **Apply Engineering Principles and Diagnostic Reasoning in Reliability Contexts** Students develop foundational knowledge in mechanics, materials, and electrical systems. They interpret technical documentation (e.g. schematics, standards, OEM manuals) to identify performance deviations and fault conditions. Through guided investigations and case-based scenarios, they begin to apply structured problem-solving methods and recognise how subsystems interact within asset lifecycles.	Potential Unit: **Interpret complex technical documentation to support diagnostic reasoning** Students develop diagnostic reasoning skills through hands-on experience with applied physics and materials behaviours in the field. They interpret multi-source documentation (drawings, datasheets, compliance codes) to support fault investigations and engineering modifications.	Potential Unit: **Lead diagnostic investigations to improve system reliability through engineering input** Students lead performance improvement initiatives by integrating engineering calculations, condition data and design documentation. They advise on system upgrades or design adjustments based on failure trends.
Capability Theme 2: Safety, Risk and Environmental Compliance Covers the identification of hazards, application of Work Health Safety (WHS) legislation, and environmental obligations in engineering workplaces. Includes participation in structured inspections, reporting, and compliance documentation. Students apply formal risk frameworks, including HAZOP, SIL, and criticality analysis. This theme incorporates the strategic application of standards and regulations in design, test planning, and operations, including the interpretation of ISO, AS, and site-specific regulatory frameworks.	Potential Unit: **Apply WHS and environmental protocols in engineering operations** Students are introduced to WHS legislation, hazard identification, and inspection processes. They support workplace safety practices by contributing to basic risk assessments and interpreting procedural requirements.	Potential Unit: **Conduct and document engineering risk assessments** Students apply advanced risk assessment tools such as HAZOP, SIL and JSEA to case scenarios and contribute to safety audits. They examine the regulatory basis for maintenance interventions.	Potential Unit: **Apply compliance and regulatory assurance in reliability engineering projects** Students lead site-level safety evaluations and prepare compliance documentation for external audits. They assess complex regulatory implications for project or system changes.
Capability Theme 3: Condition Monitoring and Diagnostics Focuses on the practical application of data-collection tools and diagnostic techniques, including vibration analysis, thermography, oil analysis, and NDT. Students develop proficiency in identifying patterns, trends, and anomalies using advanced instrumentation, monitoring platforms, and digital visualisation tools. Students use AutoCAD and digital plant models to locate monitored assets, record sensor positions, and link diagnostic findings to equipment schematics and layout drawings, reinforcing the connection between analytical data and physical systems. The theme includes structured approaches to failure investigation (e.g. Weibull analysis and failure-inspection protocols) and incorporates advanced instrumentation methods for asset-health diagnostics. The theme also examines how condition-monitoring data supports sustainable asset management by extending	Potential Unit: **Conduct supervised condition monitoring and data recording** Students begin data collection tasks using basic instrumentation (vibration meters, thermal sensors, oil sampling tools) and record observations under supervision. They develop an understanding of equipment condition indicators.	Potential Unit: **Analyse condition monitoring data to inform asset reliability** Students independently conduct diagnostic testing using multiple methods (oil analysis, thermography, vibration signature comparison). They interpret results using trend analysis and baseline data.	Potential Unit: **Design and lead a multi-method diagnostic program** Students design condition monitoring regimes using multiple technologies. They coordinate testing programs, review diagnostic data and validate failure hypotheses through inspection and analysis.

Capability Theme	Year 1	Year 2	Year 3
equipment life, reducing waste, and enabling circular-economy approaches to component reuse and material recovery within reliability practice.			
Capability Theme 4: Reliability Methods and Failure Prevention Develops capability in the planning, documentation, and execution of reliability-centred maintenance (RCM), FMEA, and test campaigns. Includes maintenance-strategy selection and development of test procedures aligned to lifecycle objectives. The theme includes advanced simulation methods, including system-level block modelling, reliability prediction, and digital-twin-informed performance validation. Partnership-based design approaches for failure elimination with OEMs and other stakeholders are included. The theme also builds competence in change management, work-management and planning practices that translate reliability strategies into effective field execution. Students apply task-prioritisation, scheduling, and coordination methods to integrate reliability activities with operational plans, ensuring maintenance resources are aligned to asset criticality, safety, and performance targets.	Potential Unit: **Apply basic reliability and failure analysis techniques to routine tasks** Students are introduced to preventive and predictive maintenance concepts. They explore common failure modes and contribute to basic reliability analyses using simplified FMEA structures.	Potential Unit: **Execute test procedures and coordinate structured failure investigations and reliability planning** Students participate in planning and executing test procedures, including setting test conditions and defining pass/fail criteria. They complete structured root cause analyses (5 Whys, Fishbone) and prepare technical findings. They also contribute to small-scale improvement actions arising from investigations, applying basic change-control processes to ensure modifications are documented, approved, and communicated across teams	Potential Unit: **Develop and validate system reliability strategies using digital tools** Students design and implement full RCM strategies, incorporating data, failure modes, and performance criteria. They use simulation tools (e.g. block modelling, digital twin environments) to validate improvements. They apply structured change-management practices to plan, communicate, and embed reliability improvements, ensuring that new maintenance strategies, procedures, or technologies are adopted effectively and sustain performance gains across the organisation.
Capability Theme 5: Digital Systems, Data and ERP Integration Students develop technical fluency in using CMMS, SCADA, and ERP systems to monitor asset condition, manage work orders, and track asset history. Inclusions highlight the strategic application of ERP tools (e.g. SAP) to prioritise maintenance through asset-criticality filtering, targeted scheduling, and data-driven decision-making. Students will also explore introductory scripting and coding to support data transformation, automation, and integration across platforms. Exposure to artificial decision-making tools for maintenance planning is introduced. The theme emphasises cross-functional collaboration and communication with OEMs, suppliers, and operations teams, supporting the translation of reliability insights into practical operational improvements across sectors and organisational contexts.	Potential Unit: **Apply digital tools to record and track maintenance activities** Students gain experience with CMMS platforms and SCADA interfaces to log faults, retrieve equipment histories and support work order tracking. Digital literacy and system navigation are introduced.	Potential Unit: **Apply ERP systems for asset prioritisation and work order management** Students begin to use ERP tools (e.g. SAP) to access asset hierarchies, generate reports, and apply criticality filters to prioritise maintenance. They are introduced to automation and AI features in ERP workflows.	Potential Unit: **Apply AI tools and automation techniques for predictive reliability** Students write and test scripts (e.g. Python) for asset data processing, use AI-driven platforms to predict failures, and generate maintenance plans. They build dashboards integrating ERP data feeds.
Capability Theme 6: Professional Practice, Collaboration and Influence Students develop applied professional skills in collaboration, documentation, and communication across engineering teams. This includes the preparation of structured reports, technical proposals, and the facilitation of RCA sessions. The theme includes frontline facilitation, team-development models, influence and direction-giving, and the preparation of technical and business cases. Students build commercial and financial literacy through applied study of budgeting, cost estimation, variance analysis, and life-cycle cost evaluation, enabling them to link	Potential Unit: **Communicate technical findings in reliability teams** Students contribute to team discussions, record structured observations, and assist in documenting findings from technical work. They are introduced to technical writing and communication standards, developing skills in clarity, traceability, and professional presentation of data. Students begin to understand how accurate and transparent reporting supports maintenance planning, cost	Potential Unit: **Facilitate reliability reviews and communicate improvement recommendations** Students prepare reports and briefings, contribute to team-based improvement projects, and facilitate small-group RCA sessions. They learn how to influence others through technical clarity and evidence-based reasoning. The unit builds understanding of financial and performance metrics used in reliability reporting, enabling students to translate	Potential Unit: **Lead and influence cross-functional teams in reliability decision-making** Students lead interdepartmental teams on applied projects, present business cases to management, and refine technical recommendations based on stakeholder input. They apply budgeting, cost-benefit, and life-cycle cost analysis to justify reliability initiatives, linking engineering outcomes to asset value and organisational objectives. Ethical

Capability Theme	Year 1	Year 2	Year 3
reliability decisions to organisational performance and total cost of ownership. They interpret and communicate financial and performance metrics, using dashboards and key indicators to support evidence-based decision-making. Commercial awareness is developed through contextualised case studies involving contracts, supplier agreements, and warranty conditions relevant to reliability practice. The theme also develops understanding of commercial change and implementation contexts, preparing students to apply leadership and communication strategies that support adoption of new reliability processes, technologies, and organisational improvements. Ethical conduct and professional integrity are reinforced as essential elements of leadership and decision-making, with frameworks such as Tuckman's model used to strengthen teamwork, collaboration, and accountability within multidisciplinary engineering environments.	control, and compliance within reliability programs.	technical outcomes into business language that supports decision-making. Students interpret dashboards and KPIs to communicate the organisational impact of engineering improvements.	reasoning and professional integrity guide their decision-making, ensuring that recommendations balance technical feasibility, financial responsibility, and regulatory compliance. The unit develops professional judgement in leadership, influence, and accountable decision-making within multidisciplinary environments.
Capability Theme 7: Technical Review and Assessment, Innovation and Systems Thinking This theme develops students' capability to evaluate emerging technologies, lead structured technical reviews, and manage the implementation of innovation and change within reliability and testing contexts. Students assess new materials, coatings, digital platforms, and diagnostic technologies through evidence-based feasibility studies, performance trials, and supplier collaboration. They learn to evaluate both the technical and organisational implications of adopting new technologies, applying structured change-management processes to plan, communicate, and embed improvements effectively. Systems thinking is advanced through simulation, modelling, and reliability-improvement frameworks that enable students to analyse interactions across complex engineering systems and anticipate the impact of innovation on people, processes, and performance. These capabilities are demonstrated through capstone workplace projects and integrated work-integrated learning experiences, where students lead or contribute to innovation and change initiatives that deliver measurable reliability and operational improvements. .		Potential Unit: **Evaluate emerging technologies for reliability application** Students investigate innovation drivers in reliability engineering and develop foundational technical review and assessment literacy. They evaluate emerging technologies, such as advanced coatings, sensor systems, or battery chemistries, through structured methods including literature review, supplier consultation and laboratory trials. Comparative feasibility analyses are conducted to assess technical viability, implementation risk and performance potential in applied contexts.	Potential Unit: **Plan and deliver technical reviews and innovation projects in reliability contexts** Students undertake a capstone project involving technical review and assessment, innovation implementation, change management and evaluation. They manage project scope, methodology, data analysis and reporting. A capstone could also be: • An integrated WIL model across multiple units with a final synthesis task • A multi-unit project stream culminating in an applied workplace project • A substantial final-year applied review or innovation task

Mining and Automotive Skills Alliance

Electives

Students will complete 5 Elective Units over the qualification. Electives can be drawn from any elective theme. Students may import up to two units from any other AQF level 7 qualification from a cognate discipline where the units contribute to the workplace outcome.

Elective Theme	Unit Description	Unit Description	Unit Description
Energy Systems and Sustainability Students develop applied capability in the design, testing, and reliability assurance of hydrogen, battery, and industrial energy systems that underpin sustainable mining and manufacturing operations. The theme integrates technical, regulatory, and environmental perspectives to prepare students for work in energy transition and decarbonisation contexts. Students learn to analyse system performance, assess safety and compliance risks, and apply reliability engineering methods to optimise asset integrity across hydrogen, battery, and utility networks. The theme emphasises applied science, regulatory literacy, and systems thinking in alignment with national clean energy and net zero strategies.	Potential Unit: **Apply reliability and safety principles to renewable and energy storage systems** Students develop applied expertise in the design, operation, and reliability assurance of renewable and storage technologies, including hydrogen, battery, solar, and hybrid energy systems. They examine the characteristics and risks of hydrogen and electrochemical systems, photovoltaic performance, and integration of renewable sources into industrial and remote-site operations. The unit introduces relevant Australian and international standards governing energy generation, storage, and distribution, with emphasis on system safety, compliance, and environmental sustainability. Students analyse system performance and degradation, assess storage and conversion efficiency, and apply reliability frameworks to optimise energy availability, safety, and lifecycle outcomes across mining, manufacturing, and clean-energy applications.	Potential Unit: **Apply Reliability Engineering to Energy and Utilities Systems** Students apply reliability and asset management principles to industrial energy and utility systems, including power generation, water, compressed air, and process-support infrastructure. They identify critical components, assess failure modes, and design preventive and predictive maintenance strategies to ensure operational continuity and efficiency. The unit integrates energy efficiency, system optimisation, and condition monitoring within the context of industrial decarbonisation and sustainability targets. Students use reliability-centred maintenance frameworks to improve the resilience and sustainability of energy and utility systems supporting heavy industry and remote operations.	
Digital and Data-Driven Reliability Students develop the capability to use advanced digital tools, analytics, and simulation techniques to enhance reliability decision-making across complex industrial systems. The theme integrates computational modelling, digital twin development, and data analytics for predictive maintenance and continuous improvement. It includes exposure to AI-driven diagnostics, predictive analytics, and data-automation platforms that support evidence-based reliability decisions. Students learn to extract insights from asset data, assess the performance of emerging technologies, and translate digital evidence into actionable engineering and business outcomes. Emphasis is placed on automation, data integrity, and cross-functional communication between engineering, IT, and operations teams.	Potential Unit: **Apply simulation and digital twin methods for reliability assessment** Students use computer-aided engineering (CAE) and digital-twin platforms to model and predict asset reliability under real and simulated operating conditions. They apply finite-element, thermal, and dynamic analysis methods to assess stress, fatigue, and failure risk across systems. The unit develops skills in configuring simulation environments, validating model outputs against empirical data, and using simulation to optimise design and maintenance strategies. Students apply AI-assisted optimisation or machine-learning models to refine simulations and predict asset performance under variable conditions. Students explore the integration of digital models with live data systems to support continuous reliability improvement.	Potential Unit: **Analyse asset health data and report reliability trends** Students analyse time-series and process data to monitor asset health and detect emerging reliability issues. They apply statistical process control (SPC), regression analysis, and statistical inference techniques to detect significant trends, identify deviations, and forecast failures with defined confidence levels. The unit includes visualisation and communication of analytical results using digital dashboards and data-driven storytelling. Students are introduced to AI-assisted analytics and predictive algorithms that automate trend detection and failure forecasting. Students learn to align analytical findings with operational priorities and communicate reliability insights effectively across teams.	Potential Unit: **Evaluate and integrate emerging technologies for reliability practice** Students evaluate new technologies, tools, and methods that enhance reliability and asset management. They develop frameworks for assessing technical feasibility, cybersecurity, interoperability, and cost-benefit performance. The unit builds capability in implementing digital and sensor-based innovations, including AI diagnostics, condition-monitoring platforms, and automation systems. Students prepare business cases and implementation plans to integrate emerging technologies into existing operations.

Elective Theme	Unit Description	Unit Description	Unit Description
Materials, Testing and Innovation Students explore the relationship between materials, environment, and performance in the context of reliability and asset life. The theme integrates advanced materials science, environmental testing, and laboratory analysis to support failure prevention and innovation in mining, manufacturing, and transport systems. Students learn to select appropriate materials, design accelerated testing programs, and interpret laboratory results to inform design, maintenance, and remediation decisions. The theme encourages innovation through the application of sustainable materials and modern testing technologies.	Potential Unit: **Select and assess materials for reliable performance** Students examine material properties, degradation mechanisms, and the impact of environmental conditions on performance and reliability. They analyse wear, corrosion, fatigue, and embrittlement processes and explore the use of advanced alloys, composites, and coatings in harsh industrial contexts. The unit emphasises the selection and testing of materials based on lifecycle performance and sustainability criteria. Students assess material reliability through both experimental and analytical methods, integrating results into reliability engineering frameworks.	Potential Unit: **Plan, execute and evaluate environmental and lifecycle tests** Students design and conduct accelerated testing to assess material and component reliability under stress, temperature, and environmental exposure. They apply methods such as thermal cycling, salt-spray, vibration, and accelerated aging to evaluate durability and performance. The unit develops capability in test planning, instrumentation, and data interpretation for lifecycle validation. Students learn to use test outcomes to refine maintenance schedules and improve design robustness.	Potential Unit: **Coordinate failure analysis to eliminate defects and improve reliability** Students coordinate laboratory-based analysis of failed components to inform root-cause investigations and reliability improvement. They interpret metallurgical, chemical, and microscopic results, linking laboratory findings to field data and operational contexts. The unit covers laboratory coordination, sample management, and technical reporting. Students produce integrated reports combining analytical evidence and engineering judgement for defect elimination and reliability assurance.
Industry Applications and Collaboration Students apply reliability principles to real-world mining and industrial systems and develop the collaboration and communication skills required for effective industry partnerships. The theme emphasises contextualised practice across mobile, fixed, and processing systems and explores how reliability engineering supports productivity, safety, and asset longevity. Students learn to engage with original equipment manufacturers (OEMs), suppliers, and clients to co-develop technical solutions and continuous-improvement initiatives**.**	Potential Unit: **Apply reliability engineering techniques to mobile fleet systems** Students apply reliability engineering techniques to heavy mobile equipment such as haul trucks, excavators, and shovels. They assess component failure modes, data-logging systems, and maintenance strategies for large-scale mobile fleets. The unit integrates digital diagnostics, telematics, and condition monitoring to predict and prevent downtime. Students develop improvement plans that enhance availability, reduce cost, and extend fleet life in demanding operational environments.	Potential Unit: **Apply reliability engineering techniques to fixed plant and processing systems** Students apply reliability analysis to fixed and process equipment, including conveyors, mills, crushers, and pumping systems. They use condition monitoring, failure analysis, and reliability-centred maintenance to optimise uptime and throughput. The unit builds capability in assessing bottlenecks, modelling criticality, and integrating reliability strategies within production planning. Students link technical findings to asset-management and operational-risk frameworks.	Potential Unit: **Collaborate with OEMs and customers to resolve reliability issues** Students develop skills to collaborate effectively with OEMs, suppliers, and customers on reliability improvement and product validation. They learn structured approaches for problem resolution, upgrade planning, and technical negotiation. The unit emphasises evidence-based communication, documentation, and shared learning across organisational boundaries. Students facilitate joint reviews and continuous-improvement activities to strengthen supplier and customer relationships.
Commercial and Strategic Management in Engineering Operations Students develop business and analytical capability to manage the financial, strategic, and contractual dimensions of reliability and asset-management functions. The theme connects technical performance with organisational value through cost modelling, lifecycle planning, and ethical commercial practice. Students learn to evaluate investment decisions, manage supplier performance, and align engineering activities with corporate strategy and governance frameworks.	Potential Unit: **Apply engineering finance to support reliability and asset decisions** Students apply financial and statistical tools to evaluate engineering investments and asset strategies. They perform cost-benefit analysis, capital budgeting, and risk-adjusted return calculations using real industry data. The unit develops decision-making skills for balancing reliability improvement, lifecycle cost, and operational risk. Students prepare business cases and present financial recommendations for engineering projects.	Potential Unit: **Develop strategic asset and lifecycle plans** Students develop strategies for long-term asset management, including zero-based budgeting (ZBB), asset renewal forecasting, and lifecycle optimisation. They analyse asset data to inform planning horizons, replacement schedules, and sustainability objectives. The unit integrates financial, technical, and environmental considerations to produce data-driven renewal and optimisation plans. Students align asset planning with organisational strategy and performance metrics.	Potential Unit: **Implement commercial frameworks and procurement plans for technical projects** Students explore the commercial and governance frameworks that underpin major technical and infrastructure projects. They examine contract structures, supplier performance metrics, negotiation strategies, and ethical procurement principles. The unit builds understanding of risk allocation, stakeholder engagement, and contract compliance in complex engineering contexts. Students use and evaluate procurement plans that ensure value, accountability, and transparency in technical projects.

Specialisation

A student wishing to hold a testing and validation specialisation would complete all electives for the specialisation. The testamur would indicate that the specialisation had been achieved by including (Testing and Validation) in the qualification title.

Specialisation Description	Unit Description	Unit Description	Unit Description	Unit Description	Unit Description
Specialisation: Testing and Validation Students develop applied expertise in the planning, execution, and evaluation of tests that verify and validate the reliability and performance of engineered systems across mining, automotive, and advanced manufacturing environments. The specialisation builds proficiency in environmental and lifecycle testing, risk-informed verification, and digital test automation. Students learn to design structured verification and validation (V&V) programs, apply data acquisition and analytics tools, and produce traceable documentation that meets regulatory, customer, and audit requirements. The specialisation emphasises systems thinking, safety, and digital literacy through the integration of simulation platforms, automated data pipelines, and advanced analytics for predictive decision-making.	Potential Unit: **Plan and Conduct Environmental and Lifecycle Testing** Students design and conduct environmental and lifecycle tests to validate equipment performance under simulated field conditions. They apply methodologies such as Highly Accelerated Life Testing (HALT), thermal cycling, vibration, and shock testing to assess reliability limits. The unit develops capability in configuring and calibrating data-acquisition systems, selecting sensors, scheduling test cycles, and managing test environments. Students interpret outcomes to confirm design robustness and contribute to lifecycle validation planning.	Potential Unit: **Analyse and Interpret Test Data for Reliability Decision-Making** Students process and interpret test data to support reliability and lifecycle decisions. They clean and automate datasets using analytical platforms such as Python, MATLAB, and Minitab, and apply statistical models including Weibull and lognormal analysis to determine reliability performance and confidence intervals. The unit strengthens analytical reasoning and supports predictive maintenance, lifecycle projection, and statistical assurance within integrated reliability frameworks.	Potential Unit: **Design and Execute Risk-Informed Verification Programs** Students apply structured risk-analysis tools such as Failure Modes and Effects Analysis (FMEA), Hazard and Operability (HAZOP) and Hazard Identification (HAZID) to define verification scope, acceptance criteria, and traceability. They develop V&V test plans, integrate supplier compliance data, and use digital simulation to optimise physical test effort. Human-factors considerations and cross-disciplinary review are embedded to ensure robust, safety-focused verification outcomes.	Potential Unit: **Prepare and present traceable test documentation and validation reports** Students prepare and maintain complete, auditable test documentation to demonstrate compliance and performance assurance. They develop Factory Acceptance Test (FAT) protocols, verification matrices, and close-out reports that link evidence to defined requirements. Emphasis is placed on structured test logs, data visualisation, and stakeholder briefings that communicate validation outcomes clearly and professionally across engineering, supplier, and client interfaces.	Potential Unit: **Apply digital simulation and automation tools for testing and validation** Students explore digital approaches to testing and validation through simulation, modelling, and automated data processing. They use finite-element analysis (FEA), digital-twin, and hardware-in-the-loop (HIL) platforms to predict performance and identify design risks. Automation of test pipelines and the use of AI-enabled systems to manage large datasets are introduced, supporting efficiency, reproducibility, and informed engineering decisions in complex testing environments.

Workplace Learning

Workplace Exposure and Experience	Year 1	Year 2	Year 3
Workplace Learning Workplace learning is a central and compulsory component of the Vocational Degree in Reliability Engineering. It provides the structured, applied, and progressive experience required for students to demonstrate the autonomy, professional judgement, and integration of theory and practice expected at AQF Level 7. Across all three years, students undertake supervised and assessed workplace activities in operational environments that reflect authentic industry conditions. The purpose is to ensure that graduates are work-ready, capable of applying engineering principles, and able to contribute meaningfully to reliability, testing, and improvement functions within complex industrial systems. The design of workplace learning follows a staged model that moves from observation to independent application, ensuring that learning is cumulative and aligned with both Engineers Australia accreditation expectations and the applied professional outcomes of the qualification. Activities are directly mapped to the 11 core job functions identified in the Functional Analysis, ensuring consistency between academic study, industry practice, and professional capability development.	**Structured Exposure and Guided Observation** In Year 1, students engage in structured workplace experiences that focus on observing maintenance and reliability practices under supervision. Their activities include shadowing technicians and engineers during inspections, condition monitoring rounds, and routine maintenance tasks. Students collect and record technical data (e.g. vibration readings, equipment logs), interpret basic technical documentation, and begin applying structured problem-solving frameworks (e.g. 5 Whys) in controlled environments. The emphasis is on building familiarity with plant operations, understanding asset contexts, and recognising how engineering systems function in real industrial settings Examples Include: • Observing condition monitoring tasks such as thermography and lubricant sampling (Function 1) • Recording maintenance work in a CMMS and reviewing work history (Function 2) • Observing informal failure inspections and basic fault isolation (Function 3) • Participating in toolbox talks and site inspections with WHS officers (Function 10) • Reviewing engineering drawings, schematics and manuals alongside technicians (Function 11) • Reviewing or updating component drawings in AutoCAD under supervision to confirm equipment configurations and assist with documentation control (Function 11) • Witnessing the development of basic inspection reports or checklists (Function 9) • Exposure to supplier presentations or informal briefings on new tools or materials (Function 5)	**Applied Practice and Supervised Contribution** Year 2 workplace experience shifts towards active participation in diagnostic and improvement tasks. Students independently collect and analyse equipment performance data, conduct structured condition monitoring activities, and support root cause investigations. They may assist in planning maintenance strategies, interpreting fault trends, and contributing to asset health reviews. Through exposure to CMMS/ERP systems and reliability-centred maintenance (RCM) processes, students begin to apply engineering judgement in recommending or evaluating maintenance interventions. While supervised, they take on increased responsibility for documentation, analysis and communication within multidisciplinary teams Examples Include: • Conducting vibration, thermography or oil analysis and interpreting trends (Function 1) • Contributing to asset criticality reviews and tactic development workshops (Function 2) • Participating in formal root cause investigations and supporting report preparation (Function 3) • Reviewing work order history and helping define reliability KPIs (Function 4) • Contributing to the preparation of test plans, including risk assessments and acceptance criteria (Function 6) • Researching new materials or diagnostic tools and supporting lab trials or evaluations (Function 5) • Using digital tools to extract ERP maintenance data for analysis or reporting (Function 8) • Supporting compliance checklists or assisting in internal audit preparation (Function 10) • Drafting sections of inspection reports or technical documentation under supervision (Function 9) • Attending supplier meetings or observing commissioning of small-scale systems (Function 11) • Using AutoCAD or digital plant models to support asset mapping, inspection planning, or modification proposals (Function 11)	**Integrated Application and Professional Judgement** By Year 3, students undertake extended workplace-based projects where they apply the full scope of their technical, analytical and professional capabilities. Working with real operational data and under limited supervision, they lead the investigation of complex equipment performance issues, trial reliability improvement strategies, or evaluate emerging technologies for site application. They engage directly with stakeholders, contribute to business case development, and document findings in professional reports aligned to organisational and regulatory requirements. The Year 3 experience is designed to demonstrate readiness for entry-level engineering technologist roles, meeting the application and autonomy expectations of AQF Level 7 and Engineers Australia accreditation Examples Include: • Delivering a reliability improvement project and presenting findings to stakeholders (Function 7) • Preparing test documentation, executing acceptance testing, and analysing results (Function 6) • Conducting compliance documentation reviews and preparing materials for regulator submission (Function 10) • Using ERP data to track performance and support decision-making on maintenance investments (Function 8) • Coordinating with suppliers to trial or evaluate new materials, coatings, or instrumentation (Function 5) • Authoring full inspection and improvement reports aligned with traceability standards (Function 9) • Contributing to equipment commissioning or participating in cross-functional review panels (Function 11) • Framing project scope and methodology through applied research and feasibility work (Function 4 & 5) • Applying engineering principles to justify design modifications or upgrades based on performance analysis (Function 1 & 4)

Appendix 4 – Cross Walk to National Strategies

Strategy / Plan (Year)	Purpose / Goal	Relevant priority or focus area (expanded)	Direct extract (with page or section)	Vocational Degree contribution	Mining implications (workforce, education design)	Aligned industries impacted (Yes, which)	Official link
National Hydrogen Strategy (2024)	Framework to make Australia a global hydrogen leader and support net zero	Jobs and regional development, industry supply and demand, export manufacturing of green metals and chemicals, skills and training review, and infrastructure planning	"Australia's renewable hydrogen exports could create tens of thousands of direct and indirect jobs by 2040." (p. 7)	Create a hydrogen operations and safety stream at AQF Level 7 with work-integrated learning in hydrogen precincts, modules in electrolysis systems, compressors, storage and pipeline operations, integrate hazardous area requirements, emergency response and process control, and offer micro credentials to upskill technicians into applied professional roles	Increases need for process, reliability and asset maintenance skills in hydrogen-enabled mining and downstream green metals, requires hydrogen safety, electrolysis operations, compression and transport skills in curricula and work-integrated learning	Yes, green metals, chemicals, heavy transport and logistics, industrial gas, and advanced manufacturing	https://www.dccee w.gov.au/sites/defa ult/files/documents /national-hydrogen-strategy-2024.pdf
National Battery Strategy (2024)	Build a competitive Australian battery industry as part of Future Made in Australia	Priority 2 – knowledge and skills, manufacturing scale-up, global supply chains, sustainability and circular economy	"Priority 2: Knowledge and skills — Build knowledge and skills to create secure Australian-made jobs." (Priority 2 section)	Establish a battery systems and diagnostics unit covering BMS fundamentals, cell and pack testing, thermal management, safety and incident response, storage systems operation and maintenance, recycling fundamentals, and applied data skills for condition monitoring of battery systems	Drives demand for battery-aware maintenance, testing and reliability capabilities across mining electrification and processing, including BESS and mobile fleets	Yes, advanced manufacturing cells and packs, grid and microgrids, e-mobility, recycling and remanufacturing	https://www.industr y.gov.au/publicatio ns/national-battery-strategy
National Electric Vehicle Strategy (2023)	Increase EV uptake and build supporting systems and infrastructure	Fuel efficiency standard, systems and infrastructure, safety standards, manufacturing, jobs and industry	"The transition to EVs presents a significant opportunity to develop new jobs and skills in Australia. Across the supply chain, from manufacturing through to maintenance, new skills will be needed to support the rollout of EVs." (pp. 11)	Add a high voltage systems and e mobility reliability track for mining fleets, charger commissioning and testing, diagnostics for traction and auxiliary systems, safe isolation procedures and incident investigation, integrate modules on charging infrastructure design and operations in remote sites	Accelerates demand for high voltage safety, condition monitoring, testing and diagnostics in mining haul fleets and on-site charging, cross-skilled mechanical and electrical technicians for EV systems	Yes, automotive and heavy vehicles, charging infrastructure, advanced manufacturing, mining equipment and technology services	https://www.dccee w.gov.au/sites/defa ult/files/documents /national-electric-vehicle-strategy.pdf
Working Future — Employment White Paper (2023)	Roadmap for a dynamic and inclusive labour market	Clean energy workforce expansion, regional transition, skills pathways, TAFE Centres of Excellence, migration settings	"Occupations key to the clean energy workforce will need to increase by around 30 per cent by 2033, which represents an increase of 213,000 workers. The clean energy supply workforce alone is projected to increase by	Embed regional delivery models and flexible work integrated learning, create bridging units for mid-career technicians to progress to applied professional roles, align with Centres of Excellence for clean energy, and incorporate recognition of	Signals scale of skills ramp up needed in mining adjacent energy projects, supports creation of hydrogen, electrification and critical minerals pathways inside mining qualifications	Yes, energy generation and storage, transmission, green metals, and construction	https://treasury.gov .au/sites/default/fil es/2023-10/p2023-447996-working-future.pdf

Strategy / Plan (Year)	Purpose / Goal	Relevant priority or focus area (expanded)	Direct extract (with page or section)	Vocational Degree contribution	Mining implications (workforce, education design)	Aligned industries impacted (Yes, which)	Official link
			around 127 per cent.” (p. 7)	prior learning and credit transfer pathways			
Australian Skills Guarantee — Factsheet (2024)	Use Commonwealth procurement to train the next generation	National targets for apprentices, trainees and women on major projects, construction and ICT initial focus	“Requires a minimum of 10% of all labour hours spent on the project be undertaken by apprentices/trainees. (p.2)	Consider the structure of the Vocational Degree with placements that sponsors can count toward contract targets, create integrated project-based work units, so placements meet both qualification outcomes and Skills Guarantee reporting	Useful lever for mining related precincts, energy and infrastructure that support mines to embed structured placements and gender targets in contracts	Yes, construction and project delivery, ICT for operational technology and automation	https://www.dewr.gov.au/download/15509/australian-skills-guarantee-factsheet/33769/australian-skills-guarantee-factsheet/pdf
Australian Critical Minerals Prospectus (Austrade, 2025)	Showcase and attract investment to critical minerals projects	Supply chain diversification, workforce, mining equipment technology and services capability, investment-ready projects	“A world-class mining industry, including expertise in mining equipment, technology and services, a highly skilled workforce, world-leading ESG practices.” (p. 3)	Target regional specialisations in the degree aligned to project locations and commodities, embed ESG practice, stakeholder engagement and reporting, and integrate units co-delivered with METS companies on diagnostics, automation and asset integrity	Confirms national positioning and skills expectations across critical minerals, supports aligning mining training with METS and ESG competencies	Yes, advanced manufacturing anodes and cathodes, processing and refining, export logistics	https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://international.austrade.gov.au/content/dam/austrade-assets/international/documents/reports/critical-minerals/australian-critical-minerals-prospectus-april-2025.pdf&ved=2ahUKEwjUzLbO09yPAxW7SWwGHfDZC2QQFnoECBsQAQ&usg=AOvVaw0UeRdWpD6fr5tQBw6k7Ib1
Critical Technologies Prospectus (Austrade)	Snapshot of critical technology landscape	Advanced manufacturing and materials technologies, autonomous systems and robotics, clean energy generation and storage technologies, artificial intelligence, quantum	“The Prospectus covers Australia’s competitive advantage in AI, advanced information and communication technologies, advanced manufacturing and materials, autonomous systems and robotics, clean energy generation and storage technologies, and quantum technologies.” (Web summary)	Create a digital and automation thread throughout the degree, including robotics for inspection and maintenance, AI-driven diagnostics, data engineering for condition monitoring, and operational technology security foundations	Reinforces cross-over skills that mining reliability and testing roles require, supports Industry 4.0 content in the curriculum	Yes, advanced manufacturing, robotics and automation, digital	https://international.austrade.gov.au/en/do-business-with-australia/sectors/technology/australian-critical-technologies-prospectus
Battery and Critical Minerals Prospectus (WA	Promote WA as a battery and critical minerals hub	Value chain development from extraction to processing and manufacturing, investment attraction	“Outlines investment opportunities across Western Australia’s battery and critical	Offer a WA pathway in the degree focused on processing operations, BESS operations and maintenance, and	State-level signal for workforce needs across upstream and downstream, supports targeting of training for	Yes, advanced manufacturing battery, processing and refining, mining equipment and technology services	https://www.wa.gov.au/government/publications/battery-and-critical-

Strategy / Plan (Year)	Purpose / Goal	Relevant priority or focus area (expanded)	Direct extract (with page or section)	Vocational Degree contribution	Mining implications (workforce, education design)	Aligned industries impacted (Yes, which)	Official link
Government, 2023)			minerals value chains.” (Overview page)	reliability for continuous process plants, partner with WA providers for on-site work integrated learning	processing, commissioning and reliability in battery value chains		minerals-prospectus-english

Appendix 5 – Evidence Map

This evidence map summarises findings from Phase 1 and 2 of the AUSMASA Vocational Degree project, focusing on mining, while incorporating relevant insights from the automotive sector where they intersect (e.g. electrification of mobile plant, hydrogen systems, and digital diagnostics).

Theme / Guiding Question	Evidence Source	Key Findings / Insights	Strength of Evidence	Identified Gaps / Next Steps
Workforce demand and skills shortages	AUSMASA Final Report; Focus Job Roles	**Mining:** Persistent shortages in reliability/testing engineers, geotechnical technicians, metallurgical technicians, mine schedulers/planners, and hydrogeologists. Roles demand predictive maintenance, digital diagnostics, data analytics, systems integration, and advanced instrumentation. **Automotive:** Electrification of mobile plant and heavy haulage mirrors automotive EV workforce needs, with demand for high-voltage safety, battery systems, and software-integrated diagnostics. Mining operations report difficulty finding staff with these cross-disciplinary capabilities.	Strong	More detailed demand modelling required for cross-over occupations (e.g. EV and hydrogen technologists working in both mining and transport fleets). AUSMASA workforce planning and research role.
Industry perspectives and priorities	Workshop Infographic; Consultation Themes	**Mining:** Employers prioritise vocationally grounded, workplace-integrated qualifications. Strong support for stackable, modular pathways from trades into mid-career applied professional roles. Mining companies seek graduates with hands-on systems capability, robotics/automation knowledge, and renewable energy integration skills. **Automotive:** Industry stressed need for skills in electrification of fleets, hydrogen fuel systems, and whole-of-vehicle diagnostics, which directly apply to mining mobile plant (haul trucks, loaders, light vehicles).	Strong	Further testing required on mining company appetite for long-term Work-Integrated Learning (WIL) partnerships and investment in co-designed qualifications. This will be monitored during piloting.
Current training and	AUSMASA Final Report (Training	**Mining:** Mining training pipeline ends at trade level; most upskilling delivered through Original Equipment Manufacturer (OEM) short courses (e.g. for equipment	Strong	Requires systematic mapping of OEM courses in mining and

Theme / Guiding Question	Evidence Source	Key Findings / Insights	Strength of Evidence	Identified Gaps / Next Steps
education provision	Package analysis)	diagnostics, mobile plant electrification). Advanced Diplomas are underutilised, leaving a qualification gap between trade and professional engineers. Bachelor's degrees show significant deficiencies compared to workplace needs: graduates lack practical diagnostic skills, applied systems integration, and digital/data capability for predictive maintenance and AI-driven diagnostics. Existing programs have limited coverage of the electrification of mobile plant, hydrogen systems, and autonomous haulage. They also underplay high-voltage safety, WHS compliance, and workplace-readiness due to minimal work-integrated learning. **Automotive**: Mining employers rely on OEM training for EV/hydrogen plant, replicating automotive challenges of non-portable, product-specific training.		assessment of pathways to convert into accredited AQF 7 vocational degree content. This will be addressed during Phase 3.
International models and benchmarks	Model Data; Final Report literature review	**Mining:** Dual Studies Programs (Germany, Switzerland) demonstrate structured integration of WIL, producing graduates with applied competence. UK Higher Apprenticeships show strong alignment with roles requiring advanced diagnostics and digitalisation. Mining employers supported these principles, especially for automation and electrification contexts. **Automotive:** Automotive professional degree models (e.g. applied EV engineering programs in Canada) highlight transferable lessons for mining where electrification of heavy plant and hydrogen trials are underway.	Strong	Pilot adaptation in mining settings required to validate feasibility of embedding automotive-style EV/hydrogen specialisations into mining qualifications.
Policy and regulatory settings	AUSMASA Final Report: Focus Job Roles	**Mining:** Reliability/testing engineers lack ANZSCO recognition, limiting workforce visibility. AQF review supports new Level 7 pathways, but IR/funding settings remain fragmented. Employers emphasise the need for portable qualifications recognised nationally.	Moderate	Further engagement with Engineers Australia, JSA, ABS, and state safety regulators to align

Theme / Guiding Question	Evidence Source	Key Findings / Insights	Strength of Evidence	Identified Gaps / Next Steps
		Automotive: Electrification and hydrogen systems are heavily regulated across both mining and automotive. Alignment of licensing, WHS, and safety protocols is critical if qualifications are to cover EV/hydrogen mobile plant across industries.		recognition of reliability, EV, and hydrogen-related technician roles. Will be undertaken as part of AUSMASAs normal workforce planning role. Note next scheduled OSCA update is 2027.
Learner perspectives and pathways	Workshop feedback – from training providers rather than learners.	Mid-career mining workers need recognition of prior learning and modular progression routes compatible with FIFO rosters and block release study. Concerns raised about exam-heavy assessments disadvantaging practical and neurodiverse learners. Demand for modular, accredited pathways that are recognised across industries (mining, manufacturing, transport).	Moderate	Structured learner research is still missing. Direct surveys of mining technicians working on electrified fleets would strengthen design evidence during Phase 3 in preparation for implementation.
Economic and workforce trends	AUSMASA Final Report (Environmental Scan)	**Mining:** Mining is facing transformation through automation, AI, digital systems, and the electrification of mine sites. Net-zero targets and the expansion of the critical minerals sector create demand for applied professional capability in renewable integration, hydrogen readiness, and digital operations. JSA Skills Priority List places 11 of top 20 mining roles in shortage, including reliability engineers and geoscientists. **Automotive**: Growth in EV and hydrogen vehicle skills maps directly to electrified mining fleets, requiring transferable skills across both sectors. These roles support national priorities in clean energy, sovereign capability, and productivity.	Strong	Further scenario modelling of electrification and hydrogen uptake in mining fleets is needed to forecast future workforce needs. This will be undertaken as part of AUSMASAs normal workforce planning activities.

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Appendix 6 – Functional Analysis – Testing Engineer, Version 6

This table details the key functions of the Testing Engineer role and their application in the workplace. By aligning functions to vocational degree outcomes, the table highlights how applied knowledge, cognitive and technical analysis, practical application, communication, compliance, and collaboration skills are developed for the role, reflecting testing practice. The last three columns of the table reflect content that may be included in a teaching and learning pathway to achieve a qualification.

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
Vocational Degree Criteria 1: Broad and Coherent Applied Knowledge				
Function 1: Reliability Engineering Conduct failure mode analysis (FMEA) to predict failure modes of components and processes. Optimise component and system uptime through the use of reliability-centred maintenance (RCM).	• Perform Failure Mode and Effects Analysis (FMEA) to determine possible failure modes and risks to successful testing activities.	• Principles of FMEA/FMECA and structured reliability analysis • Reliability fundamentals: MTBF, failure rate, bathtub curve • Knowledge of standards such as ISO 31000 (risk) and ISO 55000 (asset management) • Awareness of applied reliability methods in asset-intensive industries	• Apply structured FMEA systematically to components and systems) • Identify, document, and prioritise potential failure modes • Integrate FMEA findings into testing design and lifecycle reliability planning	• Exposure to cross-functional FMEA workshops in operational environments • Experience applying field reliability data to validate FMEA outcomes • Familiarity with block diagrams and reliability visualisation tools
	• Conduct risk assessments based on the outcome of FMEA and knowledge of wider systems	• Qualitative, quantitative, and semi-quantitative risk assessment approaches • Principles of risk ranking and prioritisation based on likelihood and consequence • PRA frameworks • Knowledge of operational risk categories in mining and heavy industries	• Select and apply appropriate risk assessment methods to testing • Conduct risk ranking exercises to prioritise interventions • Apply PRA to simulate scenarios and assess testing-related risks	• Participation in multidisciplinary HAZOP/HAZID/FMEA reviews • Exposure to field-based risk reviews in harsh environments • Experience using risk outputs to inform test planning
	• Create risk mitigation plans to ensure testing activities are conducted successfully.	• Knowledge of risk assessment frameworks such as FMEA, HAZOP, and PRA for test planning • Understanding of mitigation strategies specific to test environments and activities • Awareness of site-specific test safety standards and operational practices	• Develop structured risk mitigation plans for testing campaigns • Identify and address risks that may affect test validity or safety • Communicate risk mitigation strategies to site and test teams	• Exposure to conducting risk assessments for testing campaigns • Hands-on experience drafting and implementing test risk mitigation strategies • Participation in test readiness reviews and risk workshops
	• Utilise Block Diagrams and other graphical methods to adequately plan sensor installation and data pipelines with suitable redundancy.	• Knowledge of reliability block diagrams and graphical modelling methods • Principles of redundancy and system design optimisation • Awareness of applied testing architectures in mining operations	• Develop block diagrams to visualise reliability in test systems • Optimise sensor placement and redundancy planning • Integrate block diagram analysis into lifecycle testing approaches	• Experience developing and reviewing block diagrams in field testing contexts • Hands-on exposure to redundant DAQ and sensor systems • Practical familiarity with graphical reliability modelling
Function 2: Asset Strategy, Lifecycle Management and Sustainability Implement reliability strategies and sustainable processes as	• Design testing strategies to validate lifespan assumptions of components and tailor testing requirements based on expected end use case conditions.	• Reliability test strategies: truncation, test-to-failure, degradation, growth plans, and TAAF • Environmental factors and use conditions: temperature,	• Develop structured test plans with acceptance criteria aligned to expected use conditions and warranty goals • Select and execute appropriate life tests	• Hands-on use of environmental chambers, vibration rigs, and DAQ to execute life tests • Exposure to field duty-cycles and mission-profile data collection to inform lab tests

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
part of wider asset life cycle approach.		humidity, vibration, duty cycle, ESD; HALT profiles • Failure models for life prediction: Arrhenius, S-N curve, Coffin-Manson; physics-of-failure mechanisms • Sampling plans, confidence/tolerance intervals, and distribution fitting (e.g., Weibull) for life data • Reliability growth monitoring (Duane, Crow-AMSAA) and KPI tracking to refine lifespan assumptions • Industry lifecycle context and end-use operating scenarios in asset-intensive sectors	(degradation, sequential, fixed-length) based on component criticality • Apply DOE to optimise test factors and stress levels for realistic mission profiles • Analyse life data (e.g., Weibull) and compute confidence bounds to validate lifespan assumptions • Translate test insights into lifecycle strategy and asset risk decisions	• Experience coordinating with design/operations to align tests to end-use scenarios
	• Factor in potential environmental impacts over the life cycle of the asset and tailor the engineering requirements to maximise sustainability.	• Drivers of reliability requirements and targets, including ESG policies and use conditions • Environmental stresses across lifecycle (temperature, humidity, vibration) and multiple-stress testing (HALT) • Design for Reliability (DfR), Design for X (manufacturability, maintainability, testability) • Materials/parts selection, derating, standardisation, and system simplification • Lifecycle maintainability/availability economics and cost of poor reliability • Sector-specific sustainability drivers and lifecycle practices in mining/industrial contexts	• Incorporate environmental stress profiles into requirements and verification plans • Optimise designs via DfR, derating, and part standardisation to reduce lifecycle impacts • Plan predictive/condition-based maintenance strategies that support sustainability outcomes • Quantify trade-offs (cost/schedule/weight/energy) when tailoring engineering requirements	• Exposure to site environmental conditions (dust, heat, vibration) shaping engineering requirements • Experience with accelerated environmental tests and correlating to field performance • Participation in sustainability/asset strategy reviews to embed reliability in lifecycle plans
	• Maintain maintenance records during the prototype stage of product development that will assist in the development of maintenance and warranty strategies for production machines.	• Sources and uses of reliability data: prototype, development/test, field, warranty, IoT • Maintainability/availability metrics: MTTR, MTBM, MDT; operational/achieved/inherent availability • Failure reporting, analysis, and corrective action system (FRACAS) and closed-loop learning • Maintenance strategies (predictive, repair/replace	• Set up prototype-stage maintenance logs and normalise data for later analysis • Analyse bad actors, failure modes, and repair histories to inform warranty terms • Translate prototype maintenance insights into PM tasks and spare holding strategies • Integrate findings into asset management/warranty decision-making processes	• Hands-on use of CMMS (e.g., SAP PM) and prototype test logs to capture maintenance events • Exposure to FRACAS workflows linking test, failure analysis, and corrective actions • Experience collaborating with technicians and reliability engineers during prototyping

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Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		decisions, spares forecasting, warranties) • Industry practice for maintenance data capture and feedback in prototype phases		
Vocational Degree Criteria 2: Cognitive and Technical Analysis Skills.				
Function 3: Root Cause Analysis Lead investigations into failure events using techniques such as 5 Whys, Fishbone, and fault tree analysis.	• Conduct efficient root cause analysis to determine the cause of failed tests or sensors rapidly.	• Knowledge of structured RCA methods (5 Whys, Fishbone, Fault Tree, FRACAS) • Failure modes and mechanisms in instrumentation and sensor systems • Awareness of asset failure case studies and industrial defect elimination practices	• Apply RCA methods efficiently to testing/sensor failures • Isolate failure causes under time pressure using diagnostic frameworks • Implement corrective actions to restore test reliability	• Exposure to field-based RCA of sensor and test failures • Hands-on experience with defect elimination workshops in heavy industries • Participation in RCA exercises linking failed test data with corrective measures
	• Troubleshoot issues within data pipelines, as well as find remaining data that may give some value or useful learnings to an otherwise failed test.	• Data integrity, completeness, and quality assurance principles • Knowledge of DAQ systems, SCADA, PLC, and database architecture for test data • Operational practices for handling incomplete/failed datasets in mining/industrial sectors	• Diagnose bottlenecks and errors in data pipelines • Recover and reprocess partial data from failed tests • Identify salvageable insights to add value from incomplete datasets	• Exposure to DAQ, SCADA, and PLC systems in operational environments • Hands-on troubleshooting of corrupted or incomplete test logs • Experience integrating recovered data into reliability evaluations
	• Document findings and implement corrective actions for future testing activities, as well as lessons learned discussions at the completion of the project/ testing exercise.	• RCA documentation standards and structured reporting methods • Knowledge of lessons-learned frameworks and continuous improvement cycles • Corrective and preventive action planning and tracking systems	• Prepare RCA reports linking root causes with corrective/preventive actions • Facilitate lessons-learned workshops at project/test completion • Implement corrective actions and monitor effectiveness in future testing	• Exposure to documentation/reporting of RCA and lessons-learned in real projects • Experience implementing corrective actions into future test plans • Participation in lessons-learned exercises with cross-functional engineering teams
Function 4: Data Collection & Analysis Gather, interpret and report data from tests, sensors, and operational environments to support decision-making.	• Collect and capture testing and operational data from in-built sources such as PLC and SCADA systems, as well as external data acquisition systems (DAQ).	• Knowledge of PLC, SCADA, and DAQ system architectures and interfaces • Data integrity, completeness, and quality assurance principles • Awareness of mining/industrial site practices for collecting and capturing operational and test data	• Configure and connect PLC/SCADA systems to extract testing and operational data • Operate DAQ hardware/software to capture multi-channel test data • Validate and reconcile test/operational data against system setpoints	• Hands-on experience with PLCs, SCADA, and DAQ systems in industrial environments • Exposure to automated data capture from prototype or production assets • Experience integrating captured data into reliability databases
	• Validate baseline data, troubleshoot test results, and apply system tools to ensure data integrity and accuracy in testing environments.	• Knowledge of data validation principles and industrial data systems • Understanding of common analysis and troubleshooting tools	• Validate and interpret baseline data using available tools • Troubleshoot data anomalies and system errors • Apply basic data analysis to confirm test accuracy	• Exposure to test data validation and troubleshooting activities • Experience using system tools to verify data integrity and resolve issues

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Awareness of available data management and test system platforms		
	• Familiar with coding tools like Minitab, MATLAB, and Python for data analysis and automation of database queries (SQL).	• Knowledge of statistical tools for reliability and data analysis • Awareness programming languages for data processing: Python, MATLAB, SQL • Awareness of applied analytics use cases in industrial testing environments	• Perform statistical tests, regression, and survival analysis using Minitab/MATLAB	• Exposure to database systems used in asset-intensive industries
	• Analyse data, recognising and reporting on patterns and trends to validate test results against design requirements.	• Knowledge of reliability data distributions and analysis methods (Weibull, lognormal, exponential) • SPC and trend analysis techniques • Understanding of how test data validates engineering design assumptions	• • Apply statistical techniques to identify trends and anomalies in test data • Validate test results against design and performance requirements • Generate structured reports highlighting deviations and implications	• Experience conducting test data validation in prototype and production environments • Exposure to analysing large datasets for reliability trends • Hands-on participation in reviews where data validation informed design decisions
	• Process data into an easily communicable format for use in later lessons learned discussions and project closeout reporting.	• Knowledge of reporting formats and data visualisation standards • Lessons learned and project closeout frameworks • Principles of effective communication for technical data	• Prepare data summaries, charts, and dashboards tailored for lessons learned discussions • Communicate test results effectively to technical and non-technical audiences • Incorporate findings into project closeout and continuous improvement processes	• Exposure to lessons learned discussions supported by structured data reporting • Experience using visualisation tools (e.g., MATLAB, Python libraries) for test data • Hands-on participation in project closeout reviews requiring data summaries
	• Locate key system information such as specifications and setpoints in drawings and supplier documentation to assist in commissioning and troubleshooting system issues.	• Knowledge of engineering drawings, specifications, and technical standards • Awareness of supplier documentation practices and equipment manuals • Understanding of commissioning and troubleshooting requirements	• Extract critical parameters such as setpoints and tolerances from drawings/manuals • Cross-check supplier documentation against system requirement. • Use documentation insights to support commissioning and troubleshooting	• Exposure to commissioning exercises requiring reference to technical drawings • Experience troubleshooting issues using supplier manuals and specifications • •Hands-on familiarity with documentation use in real project commissioning
Function 5: Technology Utilisation and Research Conduct technical research to identify potential product and/or process improvements through new and emerging technologies.	• Conduct research into new and emerging technologies and diagnostic methods to that could improve testing efficiency and secure the data acquisition pipeline.	• Knowledge of emerging diagnostic technologies (IoT sensors, advanced DAQ, Machine Learning (ML) in reliability) • Understanding cybersecurity considerations for DAQ and test pipelines • Awareness of applied technology adoption in mining/industrial contexts	• Evaluate benefits of new diagnostic/testing technologies • Assess vulnerabilities and improve security of DAQ pipelines • Identify integration pathways for new technologies into existing workflows	• Exposure to pilot projects trialling new test/diagnostic tools • Hands-on use of prototype DAQ/sensor technologies • Participation in technology evaluation and procurement reviews

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Identify testing and technical shortcomings and identify readily available solutions that can be implemented.	• Knowledge of common inefficiencies in testing setups • Awareness of off-the-shelf solutions and industry practices • Corrective action planning and reliability improvement principles	• Conduct gap analyses of testing systems • Propose practical solutions leveraging available technologies • Implement fixes and monitor performance impact	• Exposure to troubleshooting in live testing environments • Experience implementing quick-win solutions for test improvements •
	• Conduct literature reviews of published competitor and research data and benchmark prototype performance against published results.	• Knowledge of literature review methods and publication sources • Benchmarking processes and KPIs for performance evaluation • Awareness of competitor and sector performance benchmarks	• Perform structured reviews of competitor/research publications • Benchmark test results against external standards • Translate benchmarking into actionable recommendations	• Exposure to industry benchmarking practices • Experience conducting competitor/literature reviews • Hands-on involvement aligning prototype test results with benchmarks
Vocational Degree Criteria 3: Application of Knowledge				
Function 6: Test Planning & Execution Develop and execute structured testing protocols for new and existing systems under simulated and real conditions.	• Utilise FMEA, HAZOP and HAZID studies as tools in creating requirements for V&V testing as part of a systems-level approach to testing. •	• Knowledge of structured risk analysis techniques (FMEA/FMECA, HAZOP, HAZID) • Systems engineering and V&V frameworks for complex assets • Awareness of applied hazard identification and risk workshops in industry	• Apply FMEA, HAZOP, and HAZID results to inform test requirements • Translate system-level risk findings into test acceptance criteria • Contribute to V&V test planning using structured hazard assessments	• Participation in multidisciplinary hazard studies • Hands-on experience aligning V&V test requirements with RCA outputs • Exposure to industry workshops for hazard analysis and test planning
	• Design test plans with clear acceptance criteria and testing methods. Test data required should be called out in the test plan.	• Knowledge of V&V processes and test planning methodologies • Acceptance criteria development and requirements traceability • Awareness of site-based testing standards and compliance requirements	• Write test plans with explicit test objectives, methods, and acceptance criteria • Define data collection requirements for reliability validation • Integrate site operational constraints into test plans	• Experience developing test plans in prototype and operational environments • Exposure to requirements traceability matrices in test documentation • Hands-on involvement in test planning meetings with cross-functional teams
	• Set up instrumentation and data acquisition systems.	• Knowledge of sensors, DAQ hardware/software, and calibration principles • Understanding of signal processing, accuracy, and noise reduction • Awareness of instrumentation practices in industrial test contexts	• Install, configure, and calibrate instrumentation and DAQ systems • Integrate sensors with PLC/SCADA systems for data acquisition • Verify data integrity and system operability before testing	• Hands-on setup of DAQ systems in prototype and field test environments • Exposure to commissioning processes requiring sensor/DAQ configuration • Experience troubleshooting instrumentation and data channels on site
	• Co-ordinate with site operations teams to facilitate the resourcing for conducting tests.	• Knowledge of site operations structures and resourcing requirements • Awareness of safety and compliance frameworks relevant to test execution	• Engage with site operations to align test scheduling and resourcing • Plan for equipment, manpower, and site access needed for tests	• Exposure to site-based test execution requiring cross-team coordination • Hands-on experience organising resourcing for prototype/field tests

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Understanding of logistics planning for testing in live industrial environments	• Ensure test activities comply with operational standards and safety protocols	• Participation in operational planning meetings before testing
	• Lead risk assessment exercises for conducting tests and suggest risk mitigation strategies.	• Knowledge of risk assessment methods (qualitative, quantitative, PRA) • Understanding of risk mitigation planning in testing contexts • Awareness of site-based risk management frameworks	• Facilitate risk assessment workshops specific to planned tests • Develop mitigation strategies for identified risks • Communicate risk outcomes and mitigations to stakeholders	• Participation in risk assessments for site testing activities • Hands-on application of PRA models to simulate test risks • Experience leading risk mitigation planning for live test environments
	• Consider and manage testing risks associated with the human factor, such as measurement error and operator inconsistency.	• Knowledge of human reliability analysis (HRA) and error modes • Understanding of measurement uncertainty and error propagation • Awareness of operator training and competency frameworks in testing	• Identify potential human factor risks in test execution • Design procedures and training to minimise operator variability • Implement cross-checking and redundancy to mitigate measurement errors	• Exposure to lessons-learned reviews highlighting human factor risks • Hands-on experience in calibrating instruments to reduce operator error • Participation in human factors risk assessments during test planning
Function 7: Continuous Improvement Drive improvements to product reliability, testing efficiency, and lifecycle performance through structured improvement initiatives.	• Identify bottlenecks in the testing and data acquisition process and develop improvement plans.	• Knowledge of process mapping, value stream mapping, and bottleneck analysis • Understanding of data acquisition workflows and integration points • Awareness of operational inefficiencies observed in industry test programs	• Apply Lean/Six Sigma tools to identify and address bottlenecks • Develop improvement plans that enhance efficiency of test workflows • Implement corrective actions and monitor improvement outcomes	• Exposure to process improvement initiatives in field testing • Hands-on use of VSM, Pareto charts, and RCA for bottleneck identification • Experience coordinating improvement plans with test engineering teams
	• Research and procure more suitable testing equipment to get more accurate testing results and to reduce the risk to testing/ operations personnel.	• Knowledge of test equipment specifications, calibration, and safety standards • Awareness of procurement and vendor evaluation processes • Understanding of ergonomics and safety in test environments	• Evaluate testing equipment options for accuracy and suitability • Procure and implement upgraded tools to reduce personnel risk • Manage supplier relationships and ensure compliance with safety standards	• Exposure to procurement and vendor evaluation processes in industry • Hands-on experience commissioning new test equipment • Participation in safety reviews for equipment selection and deployment
	• Contribute to Six Sigma or Lean reliability projects.	• Knowledge of Lean and Six Sigma methodologies (DMAIC, SPC) • Awareness of industry adoption of Lean reliability programs	• Apply Lean/Six Sigma tools to reliability challenges • Lead or support reliability improvement projects	• Exposure to Lean/Six Sigma projects in asset-intensive industries • Hands-on application of DMAIC methods
Function 8: Systems Integration & Digitalisation Integrate advanced computation and simulation methods to increase visibility of system reliability reduce the requirement of physical testing	• Utilise simulation and CAE processes to refine testing plans and identify potential failures before testing activities begin.	• Knowledge of CAE tools (FEA, CFD, thermal modelling) for reliability prediction • Understanding of failure modes and physics-of-failure modelling • Awareness of simulation use in mining/industrial testing programs	• Develop simulation models to replicate operating conditions • Identify potential weaknesses in designs before physical tests • Integrate CAE results into test planning	• Exposure to simulation-driven design processes in industry • Hands-on experience with CAE tools (ANSYS, MATLAB Simulink, etc.) • Participation in simulation-validation loops during test planning

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
	• Utilise digital twin and hardware in the loop studies to identify and troubleshoot issues within control system architecture, where physical hardware may be at risk from conducting a real test.	• Knowledge of digital twin and HIL methods • Awareness of digital approaches replacing physical risk-heavy tests	• Build/apply digital twins for reliability analysis • Conduct HIL studies for risk mitigation	• Exposure to digital twin/HIL environments in industry • Hands-on troubleshooting using simulation environments
	• Utilise AI as a data analysis tool for large data set and database searches.	• Knowledge of AI/ML algorithms for anomaly detection and pattern recognition • Data science and big data analysis principles • Awareness of AI adoption in test data analytics in mining/industrial contexts	• Apply AI/ML models to large datasets for reliability insights • Automate database searches and trend detection with AI tools • Integrate AI outputs into lessons learned and continuous improvement	• Exposure to AI-enabled analytics projects in industry • Hands-on practice with Python/ML libraries for test data analysis • Experience validating AI-generated insights against engineering judgement
Vocational Degree Criteria 4: Communication				
Function 9: Reporting & Documentation Produce technical reports, validation protocols, and recommendations for design or process improvements.	• Write detailed design validation/ verification plans.	• Knowledge of V&V frameworks, requirements traceability, and standards • Awareness of design lifecycle and compliance requirements in industry	• Draft structured V&V plans linking design requirements to test procedures • Develop acceptance criteria and validation strategies	• Experience preparing V&V documentation for compliance reviews • Exposure to requirements traceability exercises in prototype testing
	• Write Factory Acceptance Test (FAT) plans.	• Knowledge of FAT standards, equipment qualification requirements • Awareness of customer and regulatory expectations for FAT	• Develop FAT procedures aligned with equipment design and performance requirements • Define test acceptance criteria and documentation for FAT	• Exposure to FAT reviews with customers and third parties • Hands-on involvement in developing and executing FAT protocols
	• Write test procedure documents.	• Knowledge of test procedure development principles • Awareness of applied documentation practices in reliability/testing	• Draft step-by-step test procedure documentation • Ensure consistency and compliance of test documentation (	• Exposure to writing test procedure documentation • Hands-on preparation of procedural documents
	• Write technical reports, test summaries and testing program updates for involved stakeholders.	• Knowledge of technical reporting standards and effective communication practices • Awareness of reporting requirements for internal and external stakeholders	• Develop structured technical reports summarising test outcomes • Tailor communication of results for different stakeholder groups	• Exposure to technical reporting processes in industrial testing programs • Experience preparing reports for engineering and program stakeholders
	• Maintain testing logs as a tool for assisting with data analysis and troubleshooting activities.	• Knowledge of logging practices and FRACAS systems • Awareness of maintenance and baselining workflows	• Maintain structured test logs documenting procedures, anomalies, and outcomes • Use logs as a basis for troubleshooting and RCA	• Hands-on use of CMMS/FRACAS and logging systems in prototype environments • Exposure to log-based troubleshooting during test campaigns
	• Present findings to engineering, program, and external stakeholders such as customer organisations.	• Knowledge of presentation and stakeholder communication methods • Awareness of customer expectations in test reporting	• Prepare and deliver presentations summarising test outcomes • Engage stakeholders in technical discussions and Q&A	• Experience presenting results to internal and external audiences • Hands-on involvement in stakeholder engagement during test programs
	• Engage with specialist 3rd party testing personnel where required by standards and communicate.	• Knowledge of third-party testing standards and regulatory requirements	• Coordinate and communicate with third-party test personnel	• Exposure to joint test campaigns involving external providers

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	**Test Engineer Application**	**Knowledge**	**Skills**	**Exposure to and Experience with**
		• Awareness of collaboration protocols with external testing providers	• Integrate third-party test results into program reports	• Experience reviewing and incorporating external test outcomes
	• Write project closeout reports and lessons learned documents from testing programs.	• Knowledge of project closeout and lessons learned frameworks • Awareness of continuous improvement practices based on test results	• Prepare structured project closeout documentation • Facilitate lessons learned reviews and document key findings	• Exposure to project closeout activities in testing environments • Hands-on experience preparing lessons learned reports
Function 10: Standards & Compliance Ensure compliance with quality, safety, and performance standards (e.g. ISO, MIL-STD, AS/NZS)	• Interpret and apply relevant standards, particularly quality and standards ISO-9001 and risk management standard AS-4024.	• Knowledge of ISO-9001 and AS-4024 standards (TE focus) • Awareness of compliance practices in industry	• Interpret and apply relevant standards to testing/reliability (	• Exposure to applying ISO and AS standards in testing projects
	• Locate and utilise application-specific standards and develop testing plans that adhere to and verify the requirements set out in these standards.	• Knowledge of sector-specific standards (International Electrotechnical Commission (IEC), ISO, American Society for Testing and Materials (ASTM), MIL-STD) • Awareness of industrial practices for applying standards to test plans • Understanding traceability and requirements verification frameworks	• Identify applicable standards for a given technology or application • Develop test plans directly aligned to standard requirements • Verify compliance and document adherence in test execution	• Exposure to compliance-driven test campaigns • Experience aligning prototype test programs with application standards • Hands-on use of standards databases and compliance checklists
	• Maintain document traceability for test verification records and testing risk assessments, particularly when it is called out in a standard.	• Knowledge of document control and traceability practices (ISO-9001) • Understanding of verification recordkeeping requirements • Awareness of industry traceability practices in safety-critical sectors	• Maintain structured records for test verification and risk assessments • Apply traceability tools such as requirements matrices • Ensure documentation integrity and accessibility for audits	• Experience using electronic document management systems (EDMS) • Exposure to compliance audits requiring full document traceability • Hands-on involvement in recordkeeping for regulated test programs
	• Maintain visibility over standards as they evolve, particularly when developing novel technologies	• Knowledge of standards development processes and update • Awareness of emerging standards for new technologies • Understanding of compliance risks when standards evolve	• Monitor changes in relevant standards and assess impacts on testing • Engage with standards bodies and industry groups • Update testing procedures and plans to remain compliant	• Exposure to evolving standards in sectors such as automation and renewables • Experience updating procedures in response to new standards • Participation in industry forums discussing standardisation trends
Function 11: Cross-functional Collaboration Liaise with design, manufacturing, operations, and maintenance teams to ensure reliability objectives are integrated	• Participate in design reviews and change control boards.	• Knowledge of design review processes and configuration/change management frameworks • Understanding of requirements traceability and design validation practices • Awareness of applied design review practices in asset-intensive industries	• Contribute reliability/testing perspectives to design reviews • Evaluate impact of design changes on test plans and commissioning • Document change impacts and support approval workflows	• Exposure to design review and change board meetings in industry projects • Hands-on experience reviewing engineering drawings and test requirements • Participation in change management processes for prototype testing

Workplace Focus		Teaching and Learning Focus		
Key Functions/skill	Test Engineer Application	Knowledge	Skills	Exposure to and Experience with
	• Participate in HAZID and HAZOP during product development.	• Knowledge of structured hazard analysis methodologies (HAZID, HAZOP) • Understanding of risk management principles and mitigation strategies • Awareness of applied hazard studies during product development phases	• Participate in hazard identification workshops for design and development • Identify test implications arising from HAZID/HAZOP findings • Support incorporation of risk mitigations into design/test planning	• Exposure to multidisciplinary HAZID/HAZOP studies • Hands-on participation in linking hazard findings to testing requirements • Experience documenting and tracking hazard mitigations through testing
	• Support commissioning and handover to operations.	• Knowledge of commissioning practices and handover frameworks • Awareness of cross-disciplinary involvement during handover	• Support commissioning validation activities • Prepare documentation to support handover	• Exposure to commissioning projects • Hands-on support during project handover
	• Work closely with OEMs to rectify manufacturing or use-case specific issues found through testing activities.	• Knowledge of OEM-manufacturer relationships and feedback loops • Understanding of defect reporting and corrective action systems • Awareness of supplier quality management systems	• Communicate test findings and reliability issues to OEMs • Collaborate with OEMs to define corrective actions • Support validation of OEM-implemented fixes	• Exposure to OEM collaboration for resolving manufacturing issues • Hands-on experience in supplier/OEM feedback loops • Participation in issue resolution workshops with OEM engineers
	• Work closely with discipline project engineers for troubleshooting activities during testing.	• Knowledge of troubleshooting frameworks and system diagnostics • Understanding of interdisciplinary engineering collaboration • Awareness of industry practices for joint troubleshooting efforts	• Support troubleshooting during testing • Collaborate with electrical, mechanical, and controls engineers to resolve issues • Document troubleshooting steps and outcomes for future lessons learned	• Exposure to troubleshooting during live test campaigns • Hands-on experience resolving cross-disciplinary technical issues • Participation in site-based troubleshooting with project engineers

Appendix 7 – Benchmarking

Criterion	Comparator 1	Comparator 2	Comparator 3
Qualification title and purpose	**Advanced Diploma Advanced Diploma of Engineering Technology – Electrical/Mechanical (MEM60122) (Australian Institute of Engineering and SM TAFE)**	**Degree Apprenticeship in Mechanical Engineering**	**Bachelor of Engineering Technology**
Jurisdiction and provider (VET, Higher Ed, or dual accreditation)	• Provided by Registered Training Organisations (RTOs) such as the Australian Institute of Engineering (AIE) and South Metropolitan TAFE among others. • VET (Vocational Education & Training) qualification under the Australian Qualifications Framework (AQF Level 6). The national code is MEM60122 – Advanced Diploma of Engineering (sometimes described as Engineering Technology – Electrical or Mechanical).	RMIT The program is a dual-sector/dual award "degree apprenticeship" model. It combines both vocational (advanced diploma) and higher education (bachelor) study and employment.	• CQUniversity (CQU) • Higher Education bachelor program • Bachelor Degree (post-nominal BEngTech)
Level equivalence to AQF Level 7	Level 6 – Advanced Diploma.	• Level 6 - Advanced Diploma of Engineering (Mechanical) • Level 8 - Bachelor of Engineering (Mechanical Engineering) (Industry Practice) (Honours)	Level 7 - Bachelor Degree (post-nominal BEngTech)
Volume of learning, typical years (include "distribution between structured and work-integrated learning")	• **Duration** across providers varies- full-time completion in around 12–24 months (or longer via part-time/traineeship). • 30 units of competency to be completed (7 core + 23 electives) for MEM60122. • **Structured vs WIL**: No clearly quantified fixed number of industry-placement hours for this qualification (unlike many higher-ed programs). The emphasis is on competency units combining theory + practical. For example, units include "Work safely and effectively in manufacturing and engineering" etc. • Because this is VET, many units are delivered in workshops and include practical assessments, simulated or real workplace tasks. Some providers mention traineeship/employment pathways. For example, South Metro TAFE notes "defence industry internship and graduate scholarship program" linked to this Advanced Diploma. • **Typical volume** ~2 years full-time; structured coursework and workshop assessments form majority; formal "industry placement" component is less clearly defined but practical tasks embedded.	• **Duration**: 5 years full-time employment plus study. • **Study/employment breakdown:** During the 5 years, you are employed full-time by an industry partner. According to RMIT, approx. 40% of time studying, 60% working (as averaged) over the 5-year duration. • The apprenticeship includes a training contract with the employer: two years for the Advanced Diploma portion, then three years of the Bachelor portion. • **Structured study:** For example, study release 1.4 days/week at the employer plus campus attendance for classes. • **Work-integrated learning:** The on-job employment is the major WIL component and includes paid employment, mentorship, real-projects.	• **Duration**: Standard 3 years full-time (or 6 part-time). • Students typically take 24 credit points per term. • CQU notes "one point of credit ≈ ~2 hours of student work per week in a term." • **Work-integrated component** is a mandatory 360 hours of Professional Engineering Practice (≥240 hours industry)

Structural model, core, specialisations, electives. Also look for capability clusters - integrated unit design rather than task clusters	• **Core units (7 units):** For MEM60122 - e.g., "Organise and communicate information (MEM16006)", "Interact with computing technology (MEM16008)", "Select common engineering materials (MEM30007)", "Manage self in the engineering environment (MEM22002)", "Apply mathematical techniques in a manufacturing engineering or related environment (MEM30012)", "Work safely and effectively in manufacturing and engineering (MEM13015)", "Participate in environmentally sustainable work practices (MSMENV272)".
	• **Electives / Specialist units (23 units): Up** to 8 from Group A (general elective) and at least 15 from Group B (specialist elective units) to tailor to mechanical,
		• **Phase 1 (Years 1-2):** Advanced Diploma of Engineering (Mechanical) – vocational units such as CAD, manufacturing, mechanical systems, project modules.
		• **Phase 2 (Years 3-5):** Bachelor of Engineering (Mechanical Engineering) (Industry Practice) (Honours) – higher-level engineering concepts, systems engineering, project design & build, industrial practice.
		• **Capability clusters / integrated learning:** The program emphasises integrated work-study clusters: from vocational foundation (manufacturing, drafting, CAD) to higher-level engineering systems, design,
			• **Core: 3 units (24 cp)**
			  ○ ENEG11005 Introduction to Contemporary Engineering
			  ○ ENEG11007 Engineering Industry Project Investigation
			  ○ ENEP14004 professional practice requirement.
			• **Majors (choose one):** Civil, Electrical, Mechanical, Resource Systems, or Aircraft Maintenance (Avionics/Mechanical).
			• Each major includes an Undergraduate Thesis delivered as ENTG13002 Project Planning + ENTG13001 Project Implementation (two-term capstone).

Criterion	Comparator 1	Comparator 2	Comparator 3
	manufacturing, mechatronics, maintenance, drafting, etc. • **Specialisations:** Mechanical / Manufacturing / Maintenance / Drafting domains. E.g., units like "Apply fluid and thermodynamic principles in engineering (MEM23006)", "Perform mechanical engineering design drafting", "Coordinate engineering projects (MEM22013)". • **Capability clusters / integrated learning:** The packaging rules imply clusters of skills – drafting + CAD + analysis + maintenance + project coordination. E.g., units combine design/draft (CAD), mathematics/analysis, materials selection, manufacturing/plant maintenance. This points to integrated capability rather than purely isolated tasks. For example, MEM30031/30033 (CAD), MEM14085 (mechanical engineering analysis techniques)	testing. RMIT says "a minor in systems engineering" is built into the degree apprenticeship. • **Electives:** While the detailed elective list is not fully featured, the Bachelor degree allows specialisation such as manufacturing, automotive, materials, etc. • **Specialisations:** Mechanical Engineering context: manufacturing, materials processing, power generation, transport, etc.	• **Plug-ins (within majors): discipline "plug-ins"** (e.g., Civil: Municipal Transportation or Structural; Electrical: Control or Power; Mechanical: Design or Energy; Resource Systems: Automation or Data Science). Several plug-in units are double-credit authentic project units (12 cp), signalling integrated, capability-cluster learning rather than discrete task clusters. • **Electives:** one elective in most majors (pre-approved list via Course Planner). • Course is project-based learning (PBL) focused on learning-in-context → work-ready capability formation.
Work-integrated learning settings (scope, supervision, assessment, reflection).	• Because this is a VET Advanced Diploma, "WIL" is embedded through competency-based practical tasks, workshops, possibly industry work, available documentation does not consistently list a formal "X hours of industry placement". • Some providers mention internships/training contracts: e.g., TAFE WA's page for MEM60122 (mechanical) mentions "Defence industry internship and graduate scholarship program" in the lab/workshop environment. • **Assessment of units:** via competency assessments (practical + theory) usually under supervision by trainers and assessors certified by the RTO. Students will complete tasks in labs or true workplaces; reflection and formal work-placement logs may or may not be part of the credential. • **Supervision:** Industry experienced trainers in workshops, simulation/practical labs; sometimes workplace mentors if in traineeship mode. For example, AIE page: "industry experienced teachers" will support you to succeed. • **Reflection:** The nature of VET competencies often requires student demonstration of knowledge + skills + application in workplace context, which typically includes reflection or documentation.	• **Scope:** Full-time employment with an industry partner for all 5 years. Paid salary. The employment contract includes the training contract. • **Supervision**: Workplace supervision and mentoring by industry professionals as part of the apprenticeship. The training contract includes "who provides the training and assessment, how, when and where". • **Assessment:** Simultaneous academic assessment (university classes) and workplace project/tasks supervised in industry. RMIT emphasises "work on employer-directed projects under the supervision of experienced industry professionals as a fully integrated member of the team". • **Reflection:** While explicit reflective logbooks are not heavily detailed publicly, the model implies ongoing reflection as part of workplace learning and academic integration (the study release days, mentorship, project-work).	• **Setting & scope:** 360 hours total PEP with ≥240 hours in industry • **Supervision & evidence:** Experience is documented in an ePortfolio and aligned to Engineers Australia Stage 1 competencies within ENEP14004. • **Assessment:** ENEP14004 is pass/fail with written assessments (three items) that require analysis of the host organisation, evidence mapping to EA Stage 1, and reflective practice/career planning.
Assessment approach, applied tasks, projects	• Units in MEM60122 include both theory and practice: e.g., "Apply mechanical engineering analysis techniques (MEM14085)" involves calculations, documentation of design, risk analysis, sustainability, life-cycle assessments. • "Prepare mechanical models for computer-aided engineering (CAE) (MEM09155)", "Perform mechanical engineering design drafting", "Use CAD to create and display 3D models (MEM30033)". These units show applied tasks/projects via CAD, modelling, drawing, analysis.	• **Early vocational phase:** applied manufacturing and mechanical workshop tasks, CAD modelling, technical drawing, fabrication, industrial project simulation. (Advanced Diploma phase) • **Bachelor phase:** higher-level projects, design, testing, systems engineering, capstone engineering project (Honours). For example the Bachelor of Engineering (Mechanical Engineering) Honours page mentions "capstone project will enable you to integrate, critically reflect and consolidate what you have learnt".	• **Capstone Thesis:** two-term, supervised project (ENTG13002/13001) confirming technologist capability. • **Authentic projects:** plug-ins include double-credit authentic project units (e.g., ENEC14014, ENEE14006/14007, ENEM14014/14015, ENER14001/14002). • **Program-wide PBL and WIL reflections**

Criterion	Comparator 1	Comparator 2	Comparator 3
	• The structure allows a mix of simulated industry projects, workshop builds, manufacturing tasks, drafting/design projects, maintenance tasks. • Because VET is competency-based, assessment is "demonstrate competency" rather than traditional exams; tasks are practical, assessed by performance-criteria, documented via portfolio/logbook.	• **Work-study integration:** "During your employment, you'll work on employer-directed projects … apply your theoretical knowledge in the workplace." • **Assessment is blended:** academic coursework + workplace performance + project deliverables.	
Graduate outcomes: technical, cognitive, professional and ethical.	• **Technical:** Graduates will have skills and knowledge to undertake para-professional and advanced technician work in mechanical, mechatronics, manufacturing, maintenance, drafting. "Select common engineering materials", "Apply fluid/thermodynamic principles", "Use CAD", "Coordinate engineering projects" etc. • **Cognitive:** Ability to apply engineering principles, analysis techniques, mathematical techniques, design judgement, possibly supervise work. For example MEM14085 involves "analyse, evaluate design, fitness for purpose". • **Professional:** Units such as "Manage self in the engineering environment (MEM22002)", "Organise and communicate information (MEM16006)", "Coordinate engineering projects (MEM22013)" cover workplace communication, teamwork, project coordination. • **Ethical / responsibility / sustainability:** Units include "Participate in environmentally sustainable work practices (MSMENV272)", "Work safely and effectively in manufacturing and engineering (MEM13015)", emphasising WHS, sustainability.	• **Technical**: Graduates will master core mechanical engineering principles (thermodynamics, fluid mechanics, materials science), design, analysis, creation of complex systems and machinery. • **Cognitive:** Ability to innovate, apply systems engineering thinking (RMIT mentions "systems engineering approach"), problem-solve, adapt to new situations. • **Professional:** Graduates will have five years of paid industry experience, be "job-ready" with real workplace skills, fully integrated in industry from day one. They will operate as professional engineers (Honours level) and be ready for roles in transport, power generation, mining, manufacturing etc. • **Ethical / responsibility:** Accreditation by Engineers Australia (Washington Accord) implies coverage of professional and ethical responsibilities. RMIT emphasises industry relevance and global recognition.	• CQU lists detailed Course Learning Outcomes by major mapping to AQF descriptors (knowledge; cognitive & technical skills; critical thinking & judgement; communication; application with responsibility/accountability) and includes outcomes around risk management, ethical practice, and professional communication; several majors also align outcomes with UN SDGs. • Program integrate skills in problem-solving, sustainable development, teamwork and communications to develop and demonstrate technical capabilities in [their] chosen field. • Apply "problem-solving skills and knowledge of scientific fundamentals to the design, testing, inspection, adaptation, commissioning, management or operation of on-site equipment, plant and sustainable systems." • Accreditation by Engineers Australia (for the Technologist level) suggests programming of outcomes aligned with recognised engineering competencies.
Entry pathways, credit, RPL and pathways to postgraduate or professional accreditation.	• **Entry pathways:** MEM60122 has no nationally mandated entry requirements per training.gov.au, though providers may set requirements (e.g., Certificate II/III, relevant trade background, maths/physics). • **Credit / RPL:** RTOs commonly allow Recognition of Prior Learning (RPL) and credit transfers for previous relevant certificates/trade qualifications. • **Pathways:** Graduates can move into Bachelor degrees (e.g., Bachelor of Engineering Technology, Bachelor Engineering Honours) or higher-level credentials. • **Professional accreditation:** Because this is a VET Advanced Diploma, it is not typically accredited by professional engineering bodies (like Engineers Australia) for "Professional Engineer" status. It provides a para-professional/technician foundation. Some units may contribute to registration requirements in specific jurisdictions (e.g., drafting, technical officer), but licensing may depend on state/field and further qualifications.	• **Entry Pathway:** Candidates must gain employment with one of RMIT's industry partner employers (recruitment by employer). RMIT says you will apply for employer-roles, training contract, then enrol. • **Credit / RPL:** Because the course is integrated, the vocational phase feeds into the bachelor; advanced standing into the bachelor for completion of vocational phase is automatic as part of the program. • **Pathway to postgraduate / professional:** The Bachelor (Honours) is accredited by Engineers Australia (Washington Accord) so enables membership and registration as a Professional Engineer in Australia and many other signatory countries.	• **Standard entry:** ATAR/SR 65, with English & General Mathematics (Units 3&4, C) or equivalents. • **Aircraft Maintenance majors:** require an Aviation Maintenance Diploma (Avionics 10600NAT or Mechanical 10599NAT) with ~1.5 years advanced standing. • **Pathways:** CQU SUN (Start Uni Now) and STEPS enabling for mature age; school pathways detail provided. • **Credit/RPL:** University-wide Credit for Prior Learning policy and calculator support assessed credit/RPL. • **Postgraduate/professional:** As a Sydney Accord (Engineering Technologist) program, graduates are positioned for Engineers Australia Technologist membership and can pursue postgraduate study; (see professional recognition below).
Licensing or professional recognition	• The MEM60122 qualification itself does not guarantee licensing. Training.gov.au notes: "In some jurisdictions, units in this qualification may relate to licensing or regulatory requirements. Licensing and regulatory	• **Engineers Australia accreditation:** Both qualifications in the apprenticeship are accredited by Engineers Australia (the advanced diploma and the bachelor) in mechanical engineering context.	• **Engineers Australia accreditation** (Sydney Accord): Bachelor of Engineering Technology (Civil/Electrical/Mechanical) is accredited, with multiple campus modes including online. This confers

Criterion	Comparator 1	Comparator 2	Comparator 3
	information is included in the relevant units of competency." • **Typical roles:** Engineering Technician, Draftsperson, Engineering Associate, rather than fully licensed Professional Engineer. • For roles requiring full engineering registration (Professional Engineer), additional study (Bachelor + honours) and accreditation may be needed.	• The Bachelor is a Washington Accord accredited program, meaning that the graduate is eligible for the multinational engineering registration process (depending on jurisdiction) and recognised internationally.	recognition at the Engineering Technologist level under the Sydney Accord. • **Aviation streams:** The aircraft maintenance majors are structured around Diploma pathways and aviation-specific units; note that CASA/EASA licensing is separate and governed by aviation regulators (the handbook indicates delivery linkages with Aviation Australia but does not claim licensing on completion)
Alignment with target roles, reliability, testing, and asset maintenance (cross-sector mobility potential)	• **Alignment:** The qualification aligns well with asset maintenance, reliability, testing, manufacturing systems, drafting, and maintenance engineering roles. For example, units include "Apply mechanical engineering analysis techniques", "Perform inspection", "Apply fluid/thermodynamic principles", "Coordinate engineering projects" etc. These are relevant to roles in reliability and maintenance. • **Cross-sector mobility:** Because the qualification covers manufacturing/mechanical/mechatronics/maintenance, graduates are mobile across sectors: oil & gas, mining, manufacturing, automotive, plant maintenance, utilities. The broad nature of specialist electives allows tailoring. • **For testing & reliability engineering specifically:** The course gives strong technician-level capability; however, for senior reliability engineer roles involving condition monitoring, advanced analytics, root cause failure analysis, you may need further study. • **For asset maintenance:** The qualification provides a solid foundation for technician roles in maintenance and reliability; clients or employers may require further certifications (e.g., ISO reliability, asset management, NDT) but this VET credential is relevant.	• **Alignment:** The program aligns strongly with roles in manufacturing, mechanical systems, materials processing, transport, energy, mining, asset-intensive industries: "mechanical engineer across a range of industries … transport, power generation, mining, material processing …" • **Reliability and testing:** Given the manufacturing/manufacturing systems mechanical breadth of the program, the ability to engage in system design, testing, material selection, fabrication and maintenance is inherent. • **Asset maintenance:** While the program is titled 'mechanical engineering' and not explicitly 'asset management' or 'maintenance engineering', the breadth supports mobility into asset maintenance roles, especially in mechanical equipment, manufacturing machinery, industrial systems. • **Cross-sector mobility:** Very high – with international accreditation, strong industrial engagement, and a broad mechanical engineering base, graduates can move across sectors (automotive, aerospace, mining, manufacturing, energy).	• **Alignments:** units such as ENEM13012 Maintenance Engineering, Industrial Control & Automation (ENEX13001), Power System Protection (ENEE13016), Embedded Microcontrollers (ENEE14006), Dynamic System Modelling & Control (ENEM14015), Capstone Thermofluid (ENEM14014), and authentic project plug-ins build testing/diagnostics, reliability thinking (design for robustness/maintainability), condition monitoring, and asset operations skills relevant to mining, energy, utilities, and manufacturing. • **Mobility**: breadth of Civil/Electrical/Mechanical/Resource Systems plus Data Science/Automation plug-ins supports cross-sector transfer (infrastructure, resources, advanced manufacturing)

Key strengths and caveats	• **Key strengths**
	  ○ Highly flexible electing structure (7 core + 23 electives) allows tailoring to mechanical/manufacturing/maintenance/drafting specialisations.
	  ○ Strong technician/associate pathway: well aligned for engineering technician roles in maintenance, manufacturing, drafting, CAD-design.
	  ○ Good practical focus (CAD, drafting, analysis, manufacturing, maintenance) ensuring applied skills.
	  ○ Pathway to higher education (Bachelor degrees) enabling upgrading later.
	  ○ At many providers, connection with industry, workshops, traineeships, making it applied.
	• **Caveats/Considerations**
	  ○ As an Advanced Diploma (AQF Level 6), it is below Bachelor (AQF Level 7), so for roles requiring full "Professional Engineer"
		• **Key strengths**
		  ○ "Earn–learn" model: Paid employment from day one, industry partner engagement, 5 years of real work + study = strong graduate employability.
		  ○ Dual qualification: Advanced Diploma (Level 6) + Bachelor Honours (Level 8) in one streamlined pathway.
		  ○ Accreditation & global recognition: Engineers Australia accreditation (Washington Accord) means professional recognition internationally.
		  ○ Industry-designed training contract: The employer co-designs training, ensures relevance to workplace needs (systems engineering, manufacturing).
		  ○ Work-integrated learning built-in: The employment is the major WIL component; structure ensures high level of practical experience.
		• **Caveats/Considerations**
			• **Key strengths**
			  ○ Clear WIL requirement with substantial industry hours and structured reflection mapped to EA Stage 1.
			  ○ Project-based learning across the program; authentic, double-credit project units embed integrated capability clusters (design-build-test; systems; sustainability).
			  ○ Multiple delivery locations and online accreditation (per EA list), widening access and flexibility.
			  ○ Capstone thesis confirms technologist practice standards.
			• **Caveats/considerations**
			  ○ Aircraft Maintenance majors depend on Diploma pathways/third-party delivery (Aviation Australia) and may not have all early units scheduled by CQU—planning is required; licensing remains external (CASA/EASA).
			  ○ Technologist level (Sydney Accord)—graduates are recognised as Engineering Technologists,

Criterion	Comparator 1	Comparator 2	Comparator 3
	status or senior engineering reliability roles, further study is likely. ◦ The public documentation often lacks specifics on formal industry placement hours, supervision/coaching models and reflective practice compared to higher-ed degrees. ◦ Because the elective choices and provider delivery vary significantly, the quality and depth of reliability/testing/asset maintenance topics may vary; students will need to check which specialist elective units are offered. • For licensing or registration purposes (e.g., as a Professional Engineer in jurisdictions) this qualification alone may not be sufficient, employers may view it as a technician credential rather than full engineer.	◦ Eligibility & employer recruitment required: Students must secure employment with a partner employer and sign a training contract, so it is not purely a university enrolment path. ◦ Commitment and schedule: The model requires working and studying simultaneously over five years – approx. 60% work / 40% study; potentially demanding. ◦ Location and availability: Program currently offered in Melbourne, domestic only for many employer partner spots. International student availability appears restricted. • Focus is typical mechanical engineering: If the goal is highly specialised asset-maintenance, reliability engineering in niche asset-intensive industry (e.g., offshore pipelines, large power-station turbines) additional specialised modules or postgraduate study may still be beneficial.	not Washington-Accord Professional Engineers. Progression to PE status typically requires further accredited study.
Overall fit for purpose rating	• **Low to moderate** • Delivers a broad but shallow foundation in mechanical, manufacturing, and maintenance engineering. • Several elective units touch aspects of testing, analysis, and project coordination, there is no coherent framework addressing the functions identified in the AUSMASA functional analysis. • Depth remains procedural; graduates demonstrate competence through replication rather than evaluation or design. • Integration across functions is weak, with learning organised around isolated units instead of system-level synthesis. Work-integrated learning (WIL) is inconsistent, some providers embed simulated workshops or short industry tasks, but there is no nationally defined placement structure or reflective component. • Professional and transferable outcomes (communication, WHS, sustainability) are covered at a basic level only.	• **Good** • Exemplifies deep functional integration, progressive analytical development, and authentic employment-based learning. • Structure achieves exceptional functional depth and professional readiness aligned with Engineers Australia's Washington Accord • Exemplary in concept, the model is not easily scalable. • Participation depends on secured employment with a partner organisation willing to fund, mentor, and supervise over five years. Entry is therefore limited to large employers (defence, automotive, advanced manufacturing) with capacity for long-term apprenticeships. • It also sits at AQF 8, overshooting the technologist-level capability targeted by AUSMASA. There is no equivalent Level 7 model accessible to regional industries, SMEs, or mid-career technicians. • The RMIT example highlights feasibility but exposes the structural gap for a nationally scalable AQF Level 7 Degree Apprenticeship requiring shorter duration, broader industry participation, and lower entry barriers.	• **Moderate** • Reaches appropriate AQF Level 7 analytical depth, integrating design, maintenance, and automation functions through project-based learning and a 360-hour mandatory Professional Engineering Practice placement. • Cultivates applied problem-solving and reflection consistent with Sydney Accord technologist expectations. • The qualification remains campus-based and episodic, WIL occurs as a finite placement rather than embedded employment. • Reliability and testing are addressed indirectly through mechanical projects rather than as explicit learning outcomes. The model therefore produces competent technologists but lacks the structural integration, scalability, and continuous work-learning cycle necessary for large-scale workforce transformation. It demonstrates how traditional university delivery cannot, on its own, close the national reliability capability gap.

Criterion	Comparator 4	Comparator 5	Comparator 6
Qualification title and purpose	**Bachelor of Technology (Motorsports)**	**Bachelor of Engineering Science (Mechanical Engineering)**	**Bachelor of Software Engineering (Honours) – Degree Apprenticeship AQF 8 but included as it is an apprenticeship.**
Jurisdiction and provider (VET, Higher Ed, or dual accreditation)	• Edith Cowan University (ECU) • Higher Education Bachelor Degree	Charles Darwin University (CDU) Bachelor of Engineering Science with Mechanical Engineering specialisation	• University of South Australia (UniSA) • Higher Education bachelor honours program delivered via a degree apprenticeship partnership with industry and the South Australian Government. • Co-delivered by Adelaide University and host employers under the same “earn-while-you-learn” model
Level equivalence to AQF Level 7	Level 7 Bachelor Degree - Bachelor of Technology (Motorsport)	Level 7 – Bachelor Degree.	AQF Level 8 • Bachelor Honours (Program is explicitly titled Bachelor of Software Engineering (Honours) (Apprenticeship).)
Volume of learning, typical years (include “distribution between structured and work-integrated learning”)	• **Duration**: Standard 3 years full-time (or part-time equivalent). • Credit Points / units: The structure shows credit points 15 cp per unit (with units like “15” shown) → likely ~360 credit points (as some external sources say total credit points 360). • **Work-experience requirement (WIL):** Before being eligible to graduate, students must complete a minimum of 8 weeks professional practice in a relevant industry environment. • Note: The motorsports project sequence (ENM3211 / ENM3212) are major applied project units in Year 3. • On the “FSAE” side: ECU’s student racing team (ECU Racing) competes internationally (Formula Student UK)	• **Duration**: 3 years full-time (or up to 6 years part-time) for domestic students. • Credit points required: 240 credit points. • **Work-Integrated Learning (WIL) / practical experience:** The 2025 version lists a “300 hours of professional practice” requirement for the mechanical stream. • This indicates a structured industry/practical component of 300 hours embedded in the curriculum. • The split between “structured” (university coursework) and WIL is not fully detailed publicly, but the 300 hours professional practice stands out as the WIL component.	• **Duration:** 5 years integrated employment + study. • The Adelaide University program specifies 192 units total: 156 units (u.) major + 30 units WIL + 6 units elective. • **WIL** is embedded in named “Industry … Practice” and project courses (see below). • 6 units (6 u) = one standard semester-long course (roughly 10 hours of total effort per week for 13 weeks). • A full-time study load is 24 units (24 u) per year (typically four 6 u courses each semester).

Structural model, core, specialisations, electives. Also look for capability clusters - integrated unit design rather than task clusters	• **Core & specialised units:** In Year 1 and Year 2, foundational engineering and motorsports-specific units (e.g., ENM1101 Race Car Anatomy) appear.
	• **Project units:** Year 3 Semester 1 includes ENM3211 Motorsports Project 1 (15 cp) and Year 3 Semester 2 includes ENM3212 Motorsports Project 2 (30 cp).
	• **Electives:** Students choose elective units (e.g., “Elective Unit x1 15 cp”) in Year 2 Semester 2 and Year 3 Semester 2.
	• **Capability clusters / integrated design**: The presence of “Race Car Systems”, “Motorsports Project 1/2”, and the ECU Racing programme supports a cluster approach (design → manufacture → test → compete) rather than strictly isolated tasks. Also the “Race Car Anatomy” and motorsport-systems units show domain specialisation.
	• **FSAE component:** ECU Racing’s involvement indicates student-build, competition vehicle work (Formula Student), aligning with the project units ENM3211/3212. For instance, ECU Racing’s team built a race car to compete in UK and Australia.
		• **Core + Specialisation:**
		  ○ First year: foundational engineering and shared units across specialisations (mechanical/electrical/civil) – basics of mathematics, physics, engineering fundamentals.
		  ○ Subsequent years: specialisation in Mechanical Engineering (mechanical stream) including areas like mechatronics, robotics, biomechanical applications, aeroplanes, cars, pumps and pipelines.
		• **Electives:** The publicly available overview mentions elective units but does not list a full elective catalogue for mechanical stream. The general course description indicates some elective choice.
		• **Capability clusters / integrated learning:**
		  ○ The mechanical stream emphasises design and build of devices (large/small) improving transportation and manufacturing production solutions.
		  ○ The curriculum allows for a pathway to a Master of Engineering, indicating progression
			• **Major** (156 u.): listed as the Apprenticeship major (APPRHSOEA) comprising the bulk of the program.
			• **WIL** (30 u, all compulsory): INFO1900 Industry Professional Practice (6 u); INFO2900 Industry System Requirements Practice (6 u); INFO2901 Industry Systems Design Practice (6 u); INFO3006 Industry Agile Project Management Practice (6 u); INFO4903 Industry IT Project 1 (6 u). These units scaffold authentic practice from requirements → design → agile delivery → capstone project, i.e., capability-clustered, integrated learning rather than isolated task blocks.
			• **Electives** (6 u): one 6-unit elective.
			• **Curriculum themes:** first-year IT foundations (programming, DB, networking), then data structures, system design, agile, DevOps, design patterns, secure development, cloud & concurrent programming, plus system architecture / SQA / scalable systems.

Mining and Automotive Skills Alliance

Criterion	Comparator 4	Comparator 5	Comparator 6
		of capability clusters (foundation → specialist → application).	
Work-integrated learning settings (scope, supervision, assessment, reflection).	• **Setting**: The "Technology Practicum" (ENS3173) and projects in Year 3 imply real-world labs and industry relevance. • **Supervision**: Students working in ECU Racing and motorsports lab are supervised by academic and industry engineers (e.g., Dr Kevin Hayward, Senior Lecturer in Vehicle Dynamics). • **Assessment & reflection:** Example unit ENM1101 includes lab sessions, logbooks, assignments and end-exam.	• **Scope:** 300 hours of "professional practice" are required prior to graduation for the mechanical stream. • **Supervision:** The course is designed in consultation with industry-leaders; the professional practice component presumably occurs in an industry setting supervised by engineering professionals. (While the exact supervision model is not deeply publicly described, this industry linkage is emphasised.) • **Assessment / Reflection:** While a full breakdown of how the 300 hours are assessed (report, logbook, reflection) is not explicitly accessible in the public description, the "professional practice" indication implies formal evaluation of experience in an engineering environment. • **Integration:** The WIL appears integrated into the degree rather than being entirely optional ("A feature of the course is the completion of 300 hours of professional practice.")	• **Setting & scope:** students are employed full-time by an industry partner and released from work to attend university; a Training Plan documents the release/study pattern. Study is delivered mostly in person at Mawson Lakes, with courses undertaken in the workplace as part of WIL. • **Supervision:** on-the-job learning occurs "shoulder-to-shoulder with experienced software engineers"; SA's model emphasises workplace supervision and assessment. • **Assessment in WIL:** program includes competency-based assessment in the workplace in addition to university assessments.
Assessment approach, applied tasks, projects	• Applied units: "Race Car Anatomy" includes workshop logbook, assignments, exam. • Projects: "Motorsports Project 1/2" likely major capstone style (15 cp and 30 cp) emphasising design/manufacture/test. • Practicum/technology lab units: "ENS3173 Technology Practicum" appears in Year 3.	• The public information states that students will engage in "hands-on practical experience" and "specialist areas" of mechanical engineering (manufacturing, devices, etc.). • Project-based tasks are implied (design and build of devices, mechatronics, robotics, etc.), but a detailed list of assessment types (capstone project, design competition, etc.) is not publicly disclosed in the summary. • The program's aim to align with industry and accreditation suggests applied tasks, team projects, lab work, and practical engineering assessment will be central.	• Programming exercises, software development artefacts, essays, exams, oral/supervised tests, plus the industry IT project in final year; competency-based workplace assessment runs alongside academic assessment.
Graduate outcomes: technical, cognitive, professional and ethical.	• **Technical**: "Apply broad discipline knowledge of the underpinning natural and physical sciences and in-depth understanding of specialist bodies of knowledge within the motorsports technology domain." • **Cognitive**: "Think critically and apply established engineering methods to broadly defined motorsports problems."; "Apply systematic engineering synthesis and design processes … with some intellectual independence." • **Professional communication:** "Demonstrate clear and coherent oral and written communication in professional and lay domains." • **Ethical & global outlook**: "Demonstrate a global outlook and knowledge of contextual factors … including respect for cultural diversity and indigenous cultural competence."; "Demonstrate … team leadership … to implement motorsports technology projects according to relevant standards of ethical conduct, sustainable practice and professional accountability."	• **Technical**: Graduates able to "design, build, and maintain large and small devices which improve transportation and provide affordable manufacturing and production solutions." • **Cognitive**: Graduates able to "think independently and find creative and logical solutions for real world challenges." • **Professional communication & teamwork:** The description mentions readiness to collaborate with other engineers and technologists (professional context). • **Ethical / sustainability / responsibility:** The mechanical specialisation description refers to "affordable manufacturing and production solutions" and the broader course guide emphasises "sustainable and ethical … engineering solutions." • **Application with responsibility/accountability:** The accreditation as a technologist program signals that graduates take responsibility for engineering practice under supervision of professional engineers.	• **Technical**: be proficient in programming, develop software systems, apply software quality assurance, DevOps, secure development, cloud & concurrent programming, and system architecture to produce reliable, maintainable, scalable solutions. • **Cognitive**: analyse requirements, design and test solutions; adapt to emerging tech & industry trends; solve complex problems using industry tools and processes. • **Professional**: work in full-time teams within industry from day one; apply agile project management, collaborate with senior engineers, and execute a professional capstone project. • **Ethical**: while not itemised as separate ethics CLOs on the public page, the degree's ACS (Seoul Accord) and Engineers Australia (Washington Accord) provisional accreditations imply coverage of professional/ethical practice consistent with those bodies' graduate standards.

Criterion	Comparator 4	Comparator 5	Comparator 6
	• **Responsibility/accountability:** "Demonstrate responsibility for own learning, professional judgement and an understanding of the scope, principles, norms, accountabilities and bounds of contemporary practice in the motorsports technology domain."		
Entry pathways, credit, RPL and pathways to postgraduate or professional accreditation.	• **Entry**: Indicative ATAR of 70 (for domestic students). • **Desirable:** Mathematics Methods ATAR and Physics ATAR or Engineering Studies ATAR (or bridging units if • **Credit / RPL:** Example precedent for credit for prior diploma (Diploma in Motorsport Technology) being awarded up to 6 units (90 credit points) of advanced standing. • **Pathway to postgraduate:** While not explicitly articulated, accreditation by Engineers Australia enables graduates to pursue further engineering honours or postgraduate study, or transfer into related engineering degrees (e.g., the double degree with Mechatronics Honours).	• **Entry Pathways:** Assumed knowledge - Stage 1 Mathematical Methods or equivalent. • **Credit / RPL:** While specific advanced standing details for mechanical stream are not extensively listed in the summary, CDU's general engineering course guide notes credit transfers and advanced standing options. • **Pathways to postgraduate study / professional accreditation:** ○ Graduates may combine with the two-year Master of Engineering to qualify as a professional engineer. ○ Accreditation: The Bachelor of Engineering Science (Mechanical) is accredited by Engineers Australia at the engineering technologist level (Sydney Accord)	• **Entry/selection:** competitive direct entry to industry-partnered apprenticeships; ATAR ~80+, • **Australian citizenship** • NPC/security clearance may be required • Applicants also encouraged to preference the standard BSE (Hons) via SATAC as a parallel path. • **Alternate pathways** include VET Cert IV+, prior higher-ed study (≥0.5 year), STAT, or approved enabling programs/IT certifications for non-school leavers. • **Credit** for prior study/experience is considered; completed courses are recognised in the on-campus degree if the training contract ends.
Licensing or professional recognition	• **Accreditation**: Course is accredited by Engineers Australia. • This accreditation gives recognition in the engineering profession (technologist/engineering technologist pathway) although the course is a Bachelor of Technology (not Bachelor of Engineering Honours) so depending on role it may require further study for full "Professional Engineer" status.	• **Accredited by Engineers Australia** at the level of engineering technologist under the Sydney Accord. • This means graduates are recognised internationally at the technologist level; for professional engineer (PE-level) status additional study (e.g., Master of Engineering) will be required.	• Australian Computer Society (ACS) – Professional, recognised via Seoul Accord. • **Engineers Australia (EA)** – Professional Engineer, recognised via Washington Accord.
Alignment with target roles, reliability, testing, and asset maintenance (cross-sector mobility potential)	• **Alignment:** The unit "Motorsports Project" and ECU Racing involvement show direct exposure to reliability, durability, testing (the race car built to compete in Formula Student) – for instance, ECU Racing "took the win … finished 200 points ahead …" demonstrating real reliability/testing in motorsport setting. • The elective list includes "Principles of Industrial Maintenance" which supports asset-maintenance capability. • **Cross-sector mobility:** While the specialisation is motorsports, many manufacturing/manufacturing systems/automotive technologies units support general manufacturing/automotive roles beyond motorsport.	• **Alignment**: Mechanical stream emphasises design, manufacturing, process control, mining, oil & gas, consultation, project management. • **Testing, reliability and asset maintenance:** The manufacturing/production orientation (devices, pumps, pipelines) supports roles in asset design, reliability engineering, maintenance engineering, manufacturing systems. • **Cross-sector mobility:** The broad mechanical engineering technologist skill set supports mobility into transport, manufacturing, oil & gas, mining, and infrastructure sectors. • For heavy asset-maintenance specialist roles, this program provides a solid technologist foundation; further study or targeted certifications may enhance asset-reliability specialisation.	• **Alignment (software):** strong alignment to software testing/QA, DevOps, secure development, system reliability (scalability/maintainability), requirements & design assurance, and agile delivery—all key in defence, critical infrastructure, health, finance and other regulated contexts. • **Cross-sector mobility**: degree apprentices are embedded with defence primes (e.g., BAE Systems, ASC, Consunet) and other partners, building domain-agnostic software engineering capability valued across sectors. • **Asset-centric contexts:** while the focus is digital systems, the toolset (requirements, SQA, DevOps/automation, secure coding) transfers to cyber-physical/embedded environments common in maintenance & reliability for defence and advanced manufacturing.
Key strengths and caveats	• **Key strengths** ○ Highly applied motorsport-specific engineering focus (Race Car Anatomy, Project 1/2) tied to a student racing team (ECU Racing) achieving international success. ○ Accreditation by Engineers Australia for a technology-level program.	• **Key strengths** ○ Flexible delivery: On-campus and online options, full-time or part-time. ○ Accreditation by Engineers Australia (technologist level) provides international recognition.	• **Key strengths** ○ Integrated employment + study from day one; fees commonly covered by employer; students graduate with five years' industry experience. ○ Structured WIL spine (30 u) with progressive Industry Practice courses → capstone project;

Criterion	Comparator 4	Comparator 5	Comparator 6
	◦ Strong integration of hands-on practical labs, workshop logbooks, project units, and industry practice (8 weeks practicum). ◦ Electives supporting broader manufacturing and maintenance roles (good flexibility). ◦ Pathway options: transfer into double degree engineering, credit for diploma prior learning. • **Caveats/considerations** ◦ Being a Bachelor of Technology (not Bachelor of Engineering Honours) means it may not automatically lead to full "Professional Engineer" registration (in some jurisdictions) without further study. ◦ Duration is 3 years and while there is practicum, the 8 weeks professional practice is relatively modest compared to some engineering programs with larger WIL components. ◦ While motorsport is highly specialised, if a student's interest is purely reliability/asset maintenance in heavy industry (mining, utilities) rather than motorsports/manufacturing, the fit might be less direct. ◦ Electives and major project units assume strong mathematics/physics backgrounds (Maths Methods/Physics ATAR recommended) and bridging units might lengthen study or require extra effort.	◦ Applied mechanical focus in devices/manufacturing/transportation providing relevance to engineering technologist roles across sectors. ◦ Built-in 300 hours professional practice gives tangible industry exposure before graduation. ◦ Clear pathway to Master of Engineering for those aiming for professional engineer status. • **Caveats/Considerations** ◦ The qualification is a Bachelor of Engineering Science (Pass) – level AQF Level 7 / technologist accreditation – not a full "Bachelor of Engineering Honours" (PE-level) by itself. If the target is full professional engineer status, additional study may be required. ◦ Specific detail on the structure of the WIL (supervision, assessment, reflection mechanism) is limited in publicly-available summary material. ◦ If a student's primary aim is highly specialised asset-maintenance, mining reliability engineering role (heavy-industry) rather than more general mechanical roles, further targeted study or certifications may add value.	explicit competency-based workplace assessment. ◦ Provisional dual accreditation (ACS Professional; EA Professional Engineer) providing international recognition (Seoul/Washington Accords). ◦ State-backed apprenticeship pathway (declared a trade under SA Skills Act 2008) signalling strong policy & industry support. • **Caveats/considerations** ◦ Provider transition: 2026+ intakes are at Adelaide University; applicants should follow Adelaide University processes and timelines (limited places; direct entry; closes 30 Sept 2025). ◦ Eligibility constraints: typically Australian citizens; NPC/security clearance may be required; defence-sector placements can narrow employer/role flexibility. ◦ Provisional accreditation: EA/ACS status is provisional (as is standard for new programs) and subject to full accreditation cycles.
Overall fit for purpose rating	• **Moderate (Niche Fit)** • Highly applied, centring on design, manufacture, and testing of racing vehicles through the ECU Racing project sequence. It demonstrates strong integration within the automotive domain and gives students direct exposure to real-world testing, data capture, and reliability under performance pressure. However, the sectoral focus on motorsport severely limits cross-sector transferability. • WIL requirement, only eight weeks of professional practice, is modest and insufficient for sustained capability development. • While it exemplifies hands-on learning, the program cannot scale beyond a small, specialised cohort and offers little relevance to mining, defence, or energy reliability functions. This niche model reinforces the need for a more flexible, multi-industry degree-apprenticeship framework.	• **Moderate** • Provides broad coverage of design, production, and maintenance functions with 300 hours of professional practice embedded. • Analytical expectations meet AQF Level 7 benchmarks, and the course articulates to a Master of Engineering for students seeking professional-engineer status. • Delivery relies on discrete coursework followed by short WIL placements. • Limited integration of reliability analysis, lifecycle assurance, or condition-monitoring functions. • Serves regional access well but does not constitute a work-integrated or scalable apprenticeship model.	• **Moderate (Software focus).** • Integrates employment and study across five years, scaffolded through progressive "Industry Practice" courses that build from requirements to design and agile project delivery. • Sustained WIL, functional integration, and deep analytical learning (AQF 8). Its dual accreditation (Engineers Australia and ACS) demonstrates strong professional outcomes. • The domain is software and validates the apprenticeship delivery mechanism in higher education. • Approach is narrow in discipline and dependent on employer partnerships, mainly in defence and ICT. • Success confirms that an embedded employment model can meet accreditation standards, but also that Australia lacks a cross-sector, physical-asset reliability counterpart at AQF Level 7, accessible to resource, energy, and manufacturing industries.

Appendix 8 – WIL Guidelines

The following guidelines are an initial draft intended to inform development activities once the units of competency are created in Phase 3. Content shown in italics indicates the type of information that may be incorporated once Phase 3 is completed.

Workplace Learning Guidelines for the Vocational Degree in Reliability Engineering

Purpose and Scope

These guidelines establish the requirements, expectations, and quality principles for workplace learning within the AQF Level 7 vocational degree. They provide providers, employers, supervisors, and learners with a consistent framework that sets out how workplace learning supports the qualification purpose, delivers applied professional outcomes, and meets the expectations of the Australian Qualifications Framework.

Workplace learning is a central requirement of the vocational degree. It is not ancillary or optional. Under the definition endorsed in Phase 1 and reflected in briefing advice to the national regulator, the vocational degree must give students access to meaningful work based learning opportunities that are integrated with curriculum outcomes and grounded in real industry environments. These guidelines ensure that such learning is designed, governed, and delivered with the quality and consistency expected at AQF Level 7.

The guidelines apply to

- all registered providers delivering the vocational degree
- all employers who host learners for workplace learning
- all learners participating in any form of workplace learning
- all industry partners involved in co design of learning settings

The guidelines apply to all modes of delivery, including employment based programs, higher apprenticeships, cadetships, structured placements, rotational models, and integrated project based learning. They do not mandate one model, but they set out consistent principles that all models must satisfy to maintain the integrity of the qualification.

Principles for Workplace Learning

These principles reflect insights from the Phase 1 consultations, the Padlet feedback, international benchmarks, the advice provided to ASQA, and expectations embedded in government policy documents including the Australian Qualifications Framework, Working Future, and national skills strategies.

Industry Alignment

Workplace learning must be anchored in real industry practice and must reflect

- current and emerging technologies
- contemporary work processes
- real problems that require applied professional judgement

- the dynamic nature of reliability engineering, testing engineering, and data driven maintenance

Stakeholders in Phase 1 emphasised that workplace learning must expose learners to genuine tasks that cannot be replicated in a classroom or simulated environment. This includes exposure to operational uncertainty, risk, commercial pressures, and multidisciplinary collaboration.

Integration with AQF Level 7 Outcomes

Workplace learning must contribute directly to the achievement of AQF Level 7 learning outcomes. It must support learners to demonstrate

- broad and coherent knowledge
- well developed cognitive, technical, and communication skills
- initiative and sound judgement
- autonomy and responsibility in professional practice
- the capacity to generate solutions in unpredictable environments

This ensures consistency with the purpose statement of the vocational degree and with national expectations for applied professional qualifications.

Structured, Planned and Documented Learning

Workplace learning must be explicitly planned and must include

- a workplace learning agreement
- a workplace learning plan
- defined supervision arrangements
- identified workplace tasks linked to units of study
- structured evidence requirements

Ad hoc or unstructured time in the workplace does not meet the expectations of workplace learning at AQF Level 7.

Safety and Wellbeing

Workplace learning must occur in safe environments. Providers and employers must jointly ensure that

- learners receive all necessary safety inductions
- high voltage, hazardous areas, remote operations, and emergency procedures are clearly communicated
- learners are protected from psychosocial harm, discrimination, bullying or harassment
- appropriate reporting and escalation mechanisms are in place

Inclusion and Equity

Workplace learning must support participation and completion for

- Aboriginal and Torres Strait Islander learners
- learners in regional and remote communities
- culturally and linguistically diverse learners
- neurodiverse learners

- women entering non-traditional fields
- shift based, rostered or FIFO workers

Providers and employers must consider reasonable adjustments, flexible models, and culturally safe approaches.

Shared Responsibility

Workplace learning requires coordinated contributions from providers, employers, supervisors, and learners. These guidelines require clarity of roles, accountability, and communication.

Continuous Quality Improvement

Workplace learning arrangements must be monitored and improved over time. Stakeholder feedback and evidence of learner outcomes must inform ongoing refinement of the program.

Required Components of Workplace Learning

To ensure consistency and quality, all providers must demonstrate that each workplace learning experience includes the following components.

Workplace Learning Agreement

A formal agreement that outlines

- the responsibilities of the provider, employer, supervisor, and learner
- the workplace tasks to be undertaken
- supervision requirements
- safety and compliance expectations
- reporting and communication processes
- dispute resolution arrangements
- insurance and liability provisions

This agreement ensures transparency and shared expectations.

Workplace Learning Plan

A structured plan that specifies

- the learning outcomes to be achieved
- the units of study aligned to the workplace tasks
- the workplace activities required to demonstrate competency
- timelines for learning, evidence collection, and review
- supervision and communication checkpoints
- methods for collecting evidence

The plan must be personalised to the workplace context and learner needs.

Supervision Arrangements

Each learner must have a designated workplace supervisor with

- relevant industry experience
- understanding of the learning outcomes

- capability to provide feedback and verify evidence
- time and resources to support the learner

Supervision may take different forms across employers or delivery models but must be adequate to ensure learning, safety, and support.

Authentic Workplace Tasks

Learners must engage in tasks that reflect

- real operational conditions
- real technical complexity
- real uncertainty and decision making
- collaboration with tradespeople, engineers, and operational staff

Examples include

- conducting diagnostic investigations
- analysing operational data to identify trends
- contributing to root cause analysis activities
- preparing or reviewing test plans
- supporting continuous improvement projects
- participating in field inspections of plant and equipment

Structured Evidence Collection

Evidence must include

- workplace artefacts such as reports, data sets, logs or diagrams
- supervisor observations
- reflective analyses
- records of problem solving or technical decisions
- formal assessment tasks linked to the curriculum

Evidence must demonstrate progression toward applied professional judgement and capability.

Ongoing Monitoring

Providers must monitor

- learner progress
- safety and wellbeing
- task suitability
- the quality of supervision
- alignment with learning outcomes

Monitoring must be proactive, not reactive.

Alignment to AQF Level 7 Outcomes

Workplace learning plays a critical role in ensuring that graduates meet AQF Level 7 expectations.

Knowledge

Provide a high level explanation that points directly to the units. The specific content required will become clear once the units are developed in Phase 3.

Learners must apply knowledge related to

- *engineering principles, systems and processes*
- *systems thinking*
- *diagnostics and data analysis*
- *automation and digital technologies*
- *reliability, testing, and asset management frameworks*
- *risk management and compliance requirements*
- *Change Management*

This includes the integration of mechanical, electrical, digital, and systems knowledge relevant to the workplace.

Skills

Provide a high level explanation that points directly to the units. The specific content required will become clear once the units are developed in Phase 3.

Workplace learning must give learners opportunities to

- *analyse and evaluate data*
- *interpret complex operational information*
- *solve unpredictable problems*
- *engage in cross functional collaboration*
- *communicate technical concepts to varied audiences*
- *Implement change processes to improve equipment or system reliability*
- *use digital platforms and advanced instrumentation*

These skills must be demonstrated through real workplace tasks.

Application of Knowledge and Skills

Learners must demonstrate

- autonomy in managing tasks
- judgement in uncertain or dynamic situations
- responsibility for outcomes
- the provision of specialist advice within broad organisational parameters

Workplace learning is essential for the demonstration of judgement and autonomy, which cannot be adequately assessed through classroom tasks alone.

Models of Workplace Learning

The vocational degree can be delivered through multiple models. Providers may use one or more models depending on employer capability, regional context, or learner needs.

Employment Based Models

These include higher apprenticeships, cadetships, or traineeships where

- learners are employed
- workplace learning is continuous
- learning and work are integrated across the entire program
- employers provide structured tasks linked to program outcomes

Structured Work Integrated Learning Placements

Consider the expected duration and % of the overall course devoted to these placements. This component represents a key value proposition of the Vocational Degree and will be defined in detail once the units are developed in Phase 3.

These placements may be block based or part time and must

- be supervised
- be aligned with the curriculum
- include defined tasks and evidence requirements
- be monitored by the provider

Integrated Workplace Projects

Clarify that these projects cannot stand alone and must operate in conjunction with the broader Work Integrated Learning framework.

Learners may undertake applied projects that

- address real workplace problems
- require collaboration with multi-disciplinary teams
- involve data analysis, diagnostics, or testing
- culminate in a formal report or presentation

These projects are especially appropriate for regional or FIFO contexts.

Rotational Placements

Where employers have multiple departments or sites, learners may rotate through

- Maintenance
- Reliability
- testing laboratories
- automation teams
- asset management functions

This provides breadth of exposure and supports broad coherent capability.

Simulation with Workplace Consolidation

Simulation may be used for

- introductory learning
- safety critical preparation
- rare or high risk tasks
- system modelling

However, simulation cannot replace the required workplace learning and must be followed by real workplace application.

Roles and Responsibilities

Provider Responsibilities

Providers must

- design workplace learning in alignment with AQF Level 7 criteria
- ensure workplace environments are suitable
- maintain academic oversight of learning and assessment
- provide support for learners and supervisors
- monitor safety, equity, and learning progression
- maintain all required documentation
- undertake validation and moderation activities

Providers carry ultimate responsibility for assessment decisions.

Employer Responsibilities

Employers must

- provide environments that meet safety and regulatory standards
- offer tasks that reflect the complexity of applied professional work
- contribute to the learner's skill development
- support reasonable adjustments
- collaborate with the provider in planning and review
- provide feedback to inform assessment

Workplace Supervisor Responsibilities

Supervisors must

- provide day to day guidance
- verify task completion and workplace performance
- support learner reflection
- contribute to evidence collection
- communicate concerns or safety issues
- participate in supervisor briefings or training if required

Learner Responsibilities

Learners must

- participate actively in workplace learning
- comply with safety procedures
- meet professional conduct requirements
- collect and present evidence
- seek support when needed
- contribute to continuous improvement

Governance and Quality Assurance

Workplace learning must be governed through a robust quality assurance framework.

Pre Placement Suitability

Providers must

- assess the workplace for suitability
- confirm safety systems
- verify supervisor capability
- ensure alignment with learning outcomes

Monitoring and Support

Providers must conduct

- scheduled check ins
- workplace visits or virtual reviews
- supervision reviews
- monitoring of progress and safety

Validation and Moderation

Assessment decisions involving workplace evidence must be

- validated against the graduate outcomes
- moderated across assessors
- documented within quality assurance systems

Record Keeping

Providers must retain

- Agreements
- Plans
- Evidence
- Communications
- monitoring reports
- validation and moderation records

Assessment in Workplace Settings

Assessment must reflect AQF Level 7 expectations.

Assessment Design

Assessment must

- require learners to apply advanced knowledge
- integrate workplace tasks with curriculum requirements
- reflect uncertainty, autonomy, and judgement

Evidence Sources

Evidence should include

- workplace artefacts
- logs or data outputs
- supervisor observations
- self-evaluations
- technical reports
- oral presentations
- project deliverables

Assessment Decision Making

Supervisor input contributes valuable evidence, however final assessment decisions must be made by the provider

- assessment must be fair, valid, reliable, and flexible
- assessment must demonstrate cumulative capability

Safety, Risk and Compliance

Workplace learning must meet all relevant safety and compliance requirements.

Safety Compliance

Providers and employers must ensure

- WHS legislative compliance
- high voltage and hazardous area compliance
- appropriate induction for all learners
- continuous risk mitigation

Incident Management

Providers and employers must implement Complaints appeals

- immediate reporting procedures
- investigation processes
- escalation pathways
- follow up and learner support

Industrial Relations Compliance

Where workplace learning involves employment, it must comply with

- relevant industrial awards
- enterprise agreements
- workplace conditions
- regulatory obligations

Inclusion and Learner Support

Workplace learning must support equitable participation.

Cultural Safety

Providers must incorporate

- culturally safe practice for Aboriginal and Torres Strait Islander learners
- consideration of cultural obligations
- partnership approaches with cultural advisors

Flexible Delivery

Workplace learning must accommodate

- FIFO and regional workers
- shift patterns
- seasonal work cycles
- remote supervision

Reasonable Adjustments

Providers must offer

- adjustments to evidence collection
- alternative communication formats
- adapted supervision models
- learning support services

Documentation and Evidence Requirements

Providers must maintain documentation that demonstrates

- alignment with the guidelines
- learner progress
- safety and supervision
- assessment outcomes

Documents include

- workplace learning agreements
- workplace learning plans

- risk assessments
- evidence portfolios
- monitoring reports
- validation and moderation records

Review and Continuous Improvement

Providers must conduct an annual review of workplace learning arrangements. Reviews must consider

- learner and employer feedback
- completion rates
- safety data
- emerging technologies
- workforce changes
- quality assurance findings

Findings must inform improvements to program design, partnerships, assessment, and learner support.

Attachment A: Workplace Learning Agreement Template

(A formal agreement template that defines the responsibilities, expectations, safety requirements, supervision arrangements, and communication processes for all parties involved in workplace learning)

Attachment B: Employer Readiness Checklist

(A structured checklist that assists providers to confirm that an employer can offer a safe, suitable, and educationally appropriate environment for workplace learning at AQF Level 7)

Attachment C: Workplace Learning Plan Template

(A detailed template for outlining learning outcomes, workplace tasks, supervision structures, timelines, and evidence requirements for each learner.)

Attachment D: Evidence Requirements Checklist

(The categories and types of evidence that learners and workplace supervisors must provide to demonstrate applied professional capability in workplace settings.)

Attachment E: Supervisor Guidance Notes

(Guidance for workplace supervisors on their role in supporting, observing, guiding, and verifying learner progress during workplace learning activities.)

Attachment F: Example Workplace Learning Task Set

(Example tasks, aligned to job functions and curriculum outcomes, that illustrate the types of authentic activities learners should undertake in workplace settings)

Mining and Automotive Skills Alliance

Appendix 9 – Letters of Support

ENGINEERS AUSTRALIA

14 November 2025

Donna Dejkovski
Acting Executive Director Training and Workforce Innovation
AUSAMA

Dear Donna,

Re: letter of support | AUSMASA | Development of an AQF Level 7 Vocational Degree in Reliability Engineering

I am writing to provide support from Engineers Australia on AUSMASA's proposed project to develop an AQF Level 7 Vocational Degree in Reliability Engineering.

Engineers Australia is the approved accreditation body for engineering education under the auspices of the International Engineering Alliance. Accredited Australian engineering programs are recognised through international accords, which set the international benchmark for education programs and competencies.

Through its Australian Engineering Accreditation Centre, Engineers Australia evaluates engineering courses against the entry-to-practice competencies for the levels of professional engineer, engineering technologist and engineering associate. AUSAMA has been engaging with Engineers Australia to understand the requirements for the AQF Level 7 Vocational Degree to be eligible for accreditation under the Sydney Accord. Graduates from an accredited Sydney Accord program are deemed to have met the entry-to-practice academic requirement for the engineering technologist.

The supply of qualified engineers across all disciplines remains insufficient, particularly in regional and remote areas. This project represents an opportunity to upskill existing trade qualified professionals and create new pathways for current trade to engineering career progression in the mining sector, assure the quality of graduates through accreditation and provide international mobility for graduates from programs that are accredited.

H. Fairweather

Dr Helen Fairweather
Head of Accreditation

Australian Engineering Accreditation Centre
E: hfairweather@engineersaustralia.org.au
P: +61 7 3226 3025
M: 0402 839 506

VET Development Centre Ltd.
Level 8, 379 Collins Street
Melbourne Victoria 3000

T: 1300 917 150
E: info@vdc.edu.au
www.vdc.edu.au

ABN 15 113 721 770

Donna Dejkovski
Acting Executive Director Training and Workforce Innovation
Australian Mining and Automotive Skills Alliance
2/180 Flinders Street
MELBOURNE VIC 3000

Via email: donna.dejkovski@ausmasa.org.au

12 November 2025

Re: AUSMASA Letter of Support to develop an AQF Level 7 Vocational Degree in Reliability Engineering

Dear Donna,

On behalf of the VET Development Centre, I am pleased to express our support for AUSMASA's proposed initiative to develop an AQF Level 7 Vocational Degree in Reliability Engineering.

The shortage of qualified reliability engineers, particularly in regional and remote areas, continues to present significant challenges for industry. This project offers an important opportunity to upskill existing trade-qualified professionals and establish clear pathways for career progression from trades to engineering roles within the mining sector.

We commend AUSMASA for its leadership in addressing this critical skills gap and look forward to seeing the positive impact this program will have on workforce capability and regional development.

Yours sincerely,

Martin Powell
Chief Executive Officer
VET Development Centre

VET Development Centre – AUSMASA Letter of Support 2025 1

From: Kirsty Waugh
To: Donna Dejkovski
Cc: James Stroud
Subject: Letter of Support: Vocational Degree in Reliability Engineering
Date: Monday, 17 November 2025 10:06:34 AM
Attachments: Outlook-fsssrmda.png

Hi Donna,

I am writing to provide support from Public Skills Australia on AUSMASA's proposed project to develop an AQF Level 7 Vocational Degree in Reliability Engineering.

This project represents an opportunity to upskill existing trade qualified professionals and create new pathways for current learners across our respective industries.

In support of the project, Public Skills Australia welcomes the opportunity to collaborate with AUSMASA as appropriate and to provide advice on stakeholders for consultation.

Kind regards
Kirsty

Kirsty Waugh
Director Training Products and Quality
kirsty.waugh@publicskillsaustralia.org.au

PUBLIC SKILLS AUSTRALIA
PUBLIC SAFETY SKILLS AUSTRALIA LTD

Jobs and Skills Councils

Public Skills Australia would like to Acknowledge the Wurundjeri people of the Kulin Nation as the Traditional Owners of the lands on which our office is located. We pay our respects to their Elders past, present and emerging, and extend our respect to Aboriginal and Torres Strait Islander peoples from all nations of this land. We thank them for their continuing role as caretakers of land, water, and Country.

Minerals Council of Australia

14 November 2025

Donna Dejkovski
Acting Executive Director Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

By email: donna.dejkovski@ausmasa.org.au

Dear Donna

Support for the development of an AQF Level 7 vocational degree in Reliability Engineering

I am writing to provide support from the Minerals Council of Australia (MCA) for AUSMASA's proposed project to develop an AQF Level 7 Vocational Degree in Reliability Engineering. This project represents a timely and strategic response to a critical skills gap in Australia's mining and industrial sectors, particularly in regional and remote communities.

The demand for qualified reliability engineers continues to outpace supply, with many operations facing challenges in maintaining asset integrity, operational efficiency, and safety standards due to workforce shortages. This project offers a practical and scalable solution by upskilling trade-qualified professionals and creating new pathways for career progression from trades to engineering roles in the mining industry.

A high level of industry engagement and expertise has been applied throughout the project's development. From establishing a strong case for vocational degrees, through to refining the focus and validating a draft qualification structure with stakeholders, AUSMASA has laid a solid foundation for the next phase.

The MCA supports the proposed co-development of the AQF Level 7 Vocational Degree in Reliability Engineering through the next phase of the project. By collaborating with training providers, industry, regulators, unions, and peak bodies, this qualification will align with national priorities and directly address the skills shortages impacting the mining industry.

The MCA will continue to support AUSMASA during the next phase of this important initiative, helping ensure the project meaningfully contributes to addressing national skills shortages, strengthening vocational education, and advancing workforce capability in the mining sector.

Yours sincerely

KAROLINA SZUKALSKA
GENERAL MANAGER – WORKFORCE, SAFETY & INNOVATION

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ABN: 21 191 309 229

10/12/2025

Donna Dejkovski
Acting Executive Director, Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

Subject; Letter of Support

Dear Donna,

I write in my capacity as a professional engineer with over fifty years of professional practice experience in private industry in the automotive, manufacturing and mining sectors which also includes over sixteen years as an Accreditation Visit Manager with the Australian Engineering Accreditation Centre.

As a Discipline Expert for this project, I am pleased to confirm my support for the AUSMASA Vocational Degree Project and the outcomes achieved during Phase Two of the project. I recognise the strategic importance of this initiative in addressing current and emerging workforce capability needs, particularly in relation to advanced technical and applied professional roles within the mining, automotive and associated sectors.

I consider the proposed AQF Level 7 vocational degree as an important mechanism for strengthening current and emerging workforce needs, supporting talent and career progression, and building the applied engineering capability required to meet the growing complexity of modern industrial environments, including electrification of plant and mobile fleets, advanced systems integration, digital and data-enabled operations, and the technical demands of decarbonisation.

Accordingly, I confirm my intention to participate in the Phase Three co-design process. This includes continuing to provide pro bono technical advice, operational insight, and the development and validation of the emerging units of competency as well as assessment and delivery advice. I also support continued engagement to ensure that the qualification reflects real workplace needs and requirements, contemporary and emerging technologies, and the practical conditions under which Australia's workforce is required to operate.

I have appreciated the collaborative approach taken by AUSMASA and look forward to contributing to continuing my involvement during the next stage of the project development.

Yours sincerely

Noel E Miller FIEAust CPEng NER APEC IntPE (Aus) GradDipEd, MEd HonDoc (Deakin)

CMEIG
CONSTRUCTION & MINING EQUIPMENT INDUSTRY GROUP

Donna Dejkovski
Acting Executive Director, Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

10 December 2025

Dear Donna,

The Construction and Mining Equipment Industry Group (CMEIG) is a Peak Body Association representing construction and mining equipment manufacturers in Australia. Our member-base has a combined revenue in excess of $20B and directly employs over 20,000 Australians.

CMEIG is pleased to confirm our support for the AUSMASA Vocational Degree Project and the outcomes achieved during Phase Two. We recognise the strategic importance of this initiative in addressing current and emerging workforce capability needs, particularly for advanced technical and applied professional roles across the mining and associated sectors.

We view the proposed AQF Level 7 vocational degree as an important mechanism for strengthening workforce readiness, supporting talent progression, and building the applied engineering capability required to meet the growing complexity of modern industrial environments, including electrification of plant and fleets, advanced systems integration, digital and data-enabled operations, and the technical demands of decarbonisation.

Accordingly, CMEIG confirms our intention to participate in the Phase Three co-design process. This includes our commitment to continue providing access to appropriate subject matter experts who can offer technical advice, operational insight, and validation of the emerging units of competency and delivery materials. We also support continued engagement to ensure the qualification reflects real workplace requirements, contemporary technologies, and the practical conditions under which our workforce operates.

We appreciate the collaborative approach taken by AUSMASA and look forward to contributing to the next stage of development.

Regards,

Frank Gili

Chief Executive Officer
Construction and Mining Equipment Industry Group Inc.

Rio Tinto

11 December 2025

Donna Dejkovski
Acting Executive Director Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

Dear Donna,

Rio Tinto Iron Ore Capability Development is pleased to confirm its support for the AUSMASA Vocational Degree Project and the outcomes achieved during Phase Two. We recognise the strategic importance of this initiative in addressing current and emerging workforce capability needs, particularly in relation to advanced technical and applied professional roles within the mining and associated sectors.

While Reliability Engineering is the primary focus of the current phase, it is not the highest-value discipline area to explore vocational degree pathways for our organisation. Nevertheless, we see this focus as a strong foundation for establishing scalable and diverse entry pathways. The approaches developed through this work have the potential to extend into critical disciplines such as electrical trades and process operations—areas that represent significant long-term value for Rio Tinto Iron Ore and provide meaningful career routes for diverse cohorts of candidates. Insights gained through this phase will be instrumental in shaping these broader pathways.

Accordingly, Rio Tinto Iron Ore Capability Development confirms its intention to participate in the Phase Three co-design process. This includes providing access, where appropriate, to subject matter experts who may be able to provide technical advice, operational insight, and review of the emerging units of competency and delivery materials. We will contribute to shaping outcomes that reflect workplace requirements, contemporary technologies, and the practical conditions under which our workforce operates.

The parties agree that this letter does not constitute a binding offer, acceptance, agreement or promise on the part of Rio Tinto Iron Ore Capability Development or the Rio Tinto Group of companies to provide any support, whether financial or otherwise.

We appreciate the collaborative approach taken by AUSMASA and look forward to contributing to the next stage of development.

Yours sincerely,

Nicole Slade
Manager, Future Workforce
Capability Development RTIO

ENGINEERS AUSTRALIA

12 December 2025

Donna Dejkovski
Acting Executive Director, Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

Via - Marilyn.Connell@ausmasa.org.au

Dear Donna

SUPPORT FOR PHASE THREE - AUSMASA VOCATIONAL DEGREE

Engineers Australia is pleased to confirm our support for the AUSMASA Vocational Degree Project and the outcomes achieved during Phase Two. We recognise the strategic importance of this initiative in addressing current and emerging workforce capability needs, particularly for advanced technical and applied professional roles across the mining and associated sectors.

We view the proposed AQF Level 7 vocational degree as an important mechanism for strengthening workforce readiness, supporting talent progression, and building the applied engineering capability required to meet the growing complexity of modern industrial environments, including electrification of plant and fleets, advanced systems integration, digital and data-enabled operations, and the technical demands of decarbonisation.

Accordingly, Engineers Australia confirms our intention to participate in the Phase Three co-design process. This includes our commitment to continue providing access to appropriate subject matter experts who can offer technical advice, operational insight, and validation of the emerging units of competency and delivery materials. We also support continued engagement to ensure the qualification reflects real workplace requirements, contemporary technologies, and the practical conditions under which our workforce operates. We would appreciate the opportunity during Phase Three to provide further input regarding professional accreditation and the criteria required to ensure graduates from these programs are internationally recognised. Our understanding of the work to date is that this will be practical.

We appreciate the collaborative approach taken by AUSMASA and look forward to contributing to the next stage of development.

Yours sincerely,

Bernadette Foley
BE(Hons) GCertEd(H.Ed) FIEAust CPEng EngExec NER
Group Executive, Professional Standards and Engineering Practice

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OFFICIAL

Government of Western Australia
South Metropolitan TAFE

11 December 2025

Donna Dejkovski
Acting Executive Director, Training and Workforce Innovation
The Mining and Automotive Skills Alliance (AUSMASA)
2/180 Flinders Street
MELBOURNE VIC 3000

Dear Donna,

South Metropolitan TAFE is pleased to confirm our support for the AUSMASA Vocational Degree Project and the outcomes achieved during Phase Two. We recognise the strategic importance of this initiative in addressing current and emerging workforce capability needs, particularly for advanced technical and applied professional roles across the mining and associated sectors.

We view the proposed AQF Level 7 Vocational Degree as an important mechanism for strengthening workforce readiness, supporting talent progression, and building the applied engineering capability required to meet the growing complexity of modern industrial environments, including electrification of plant and fleets, advanced systems integration, digital and data-enabled operations, and the technical demands of decarbonisation.

Accordingly, South Metropolitan TAFE confirms our intention to participate in the Phase Three co-design process. This includes our commitment to continue providing access to appropriate subject matter experts who can offer technical advice, operational insight, and validation of the emerging units of competency and delivery materials. We also support continued engagement to ensure the qualification reflects real workplace requirements, contemporary technologies, and the practical conditions under which our workforce operates.

We appreciate the collaborative approach taken by AUSMASA and look forward to contributing to the next stage of development.

Yours sincerely,

Kerry Banyard
Executive Director – Engineering Transport and Defence

Australian Centre for Energy and Process Training (ACEPT)
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Mining and Automotive Skills Alliance

The Mining and Automotive Skills Alliance (AUSMASA) is a Jobs and Skills Council funded by the Australian Government Department of Employment and Workplace Relations.