REQUIREMENTS FOR ACCREDITATION OF ENGINEERING EDUCATION PROGRAMMES

ACC 02

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engineering new zealand
te ao rangahau

DOCUMENT AND VERSION CONTROL

Version	Action	Approver	Date
2.1	Formatted	Standards and Accreditation Board	February 2014
2.2	Changes to terminology Renumbering of criteria	Standards and Accreditation Board	May 2016
2.3	Clarification of the purpose of the Knowledge Profile Revision to criterion 3.3 – Assessment; 4.1 – Academic Staff Changes to incorporate accreditation of postgraduate programme (new Part C) Inclusion of Contents Page	Standards and Accreditation Board	February 2017
3.1	Reformatted to align with Engineering New Zealand Brand. Revision to criterion 2.7 – Practical work experience in industry	Standards and Accreditation Board	October 2020

CONTENTS

PART A: BACKGROUND AND DEFINITIONS

1. BACKGROUND

Engineering New Zealand accredits engineering programmes against outcomes-based standards that have been established by the Dublin, Sydney and Washington Accords to define the general academic standards for entry-to-practice in the engineering profession. Our accreditation criteria for the accreditation of programmes to these International Accord standards are set out in Part B. Accreditation to an International Accord standard typically relates to undergraduate engineering programmes - NZ Diploma in Engineering, Bachelor of Engineering Technology degrees and Bachelor of Engineering Honours degrees, but the criteria are also able to accommodate graduate or postgraduate programmes that have been designed to systematically develop students to an Accord standard. This would include the accreditation of “3+2” programmes delivered within a single institution, or other “conversion” or “articulation” programmes that might be developed to build on formally assessed undergraduate study to bring graduates to an “Accord level” graduate outcome.

Engineering New Zealand has also established criteria for the accreditation of postgraduate programmes that do not deliver an International Accord graduate outcome. The criteria for the accreditation of these programmes are set out in Part C. The accreditation of such postgraduate programmes is intended to:

1. Validate postgraduate programmes as meeting a defined need as identified by the engineering community.
2. Recognise advanced programmes of study that develop a specific body of knowledge or capability that has been identified by the profession as necessary for practice in a specialised or specific area of practice. This might include practice areas with particular legal or safety implications.

Accreditation of postgraduate programmes provides assurance that graduates have acquired a defined body of knowledge in a specialised area, or to an advanced level, that is recognised for preparing graduates for practice in a particular area. On that basis the following types of postgraduate programmes will not be accreditable:

- Research-based programmes that do not deliver a defined body of knowledge
- Taught programmes that allow for a broad elective course choice

The accreditation criteria (and associated descriptors of the knowledge profile and range of problem solving) are automatically updated on any approval by the relevant Accord of exemplar graduate attributes. Any such change shall apply to accreditation activities in the following calendar year unless the Engineering New Zealand Standards and Accreditation Board (SAB) decides otherwise. Changes to the Body of Knowledge underpinning a qualification accredited under Part C of these criteria are expected to be reflected in the curriculum within a timeframe that is acceptable to the Body of Knowledge Owner.

In order to achieve accreditation a programme must have produced at least one cohort of graduates, some of whom have proceeded to engineering employment.

2. INTERPRETATION

The requirements and indicators of attainment set out below are intended to be interpreted in the context of the particular engineering discipline/field of study of the programme. Engineering New Zealand has adopted the glossary used by the International Engineering Alliance and available at http://www.ieagreements.org/assets/Uploads/Documents/IEA-Extended-Glossary.pdf

The following definitions are additional:

Open literature: all forms of information that might reasonably be available including but not limited to published research papers, codes of practice, reviews and textbooks, trade literature, standards and patents.

Tools: includes but is not limited to computational and modelling tools, codes of practice, standards and physical equipment.

3. KNOWLEDGE PROFILE

The knowledge profile exemplar for each of the relevant Accords is set out below and referenced by the specific accreditation requirements in Part B. Development of the relevant knowledge profile is only a requirement of the accreditation process to the extent that knowledge attributes are referenced within the relevant set of Accord Graduate Attributes (criterion 1.3 in Part B). As a result, providers are not expected to develop specific mappings of their curriculum or assessment against knowledge profile attributes. Rather, the knowledge profile is intended to provide additional guidance to inform curriculum design and review.

International Engineering Alliance knowledge profiles

A Washington Accord programme provides	A Sydney Accord programme provides	A Dublin Accord programme provides
WK1: A systematic, theory-based understanding of the **natural sciences** applicable to the discipline	**SK1:** A systematic, theory-based understanding of the **natural sciences** applicable to the sub-discipline	**DK1:** A descriptive, formula-based understanding of the **natural sciences** applicable in a sub-discipline
WK2: Conceptually-based **mathematics**, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline	**SK2:** Conceptually-based **mathematics**, numerical analysis, statistics and aspects of computer and information science to support analysis and use of models applicable to the sub-discipline	**DK2:** Procedural **mathematics**, numerical analysis, statistics applicable in a sub-discipline
WK3: A **systematic**, theory-based formulation of **engineering fundamentals** required in the engineering discipline	**SK3:** A systematic, theory-based formulation of **engineering fundamentals** required in an accepted sub-discipline	**DK3:** A coherent procedural formulation of **engineering fundamentals** required in an accepted sub-discipline
WK4: Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline	**SK4:** Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for an accepted sub-discipline	**DK4:** Engineering **specialist knowledge** that provides the body of knowledge for an accepted sub-discipline
WK5: Knowledge that supports **engineering design** in a practice area	**SK5: Knowledge** that supports **engineering design** using the technologies of a practice area	**DK5: Knowledge** that supports **engineering design** based on the techniques and procedures of a practice area
WK6: Knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline	**SK6:** Knowledge of **engineering technologies** applicable in the sub-discipline	**DK6:** Codified **practical engineering knowledge** in recognised practice area

A Washington Accord programme provides	A Sydney Accord programme provides	A Dublin Accord programme provides
WK7: Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability	**SK7: Comprehension of** the role of technology in society and identified issues in applying engineering technology: ethics and impacts: economic, social, environmental and sustainability	**DK7: Knowledge** of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts
WK8: Engagement with selected knowledge in the **research literature** of the discipline	**SK8:** Engagement with the **technological literature** of the discipline	

4. RANGE OF PROBLEM SOLVING

Several graduate attribute requirements in Part B use the notions of *complex engineering problems, broadly defined engineering problems* and *well-defined engineering problems.* These shorthand descriptors represent a key differentiator between programmes levels and have been characterised by International Engineering Alliance signatories as follows:

Attribute	Complex Engineering Problems have characteristic WP1 and some or all of WP2 to WP7	Broadly defined Engineering Problems have characteristic SP1 and some or all of SP2 to SP7	Well defined Engineering Problems have characteristic DP1 and some or all of DP2 to DP7
Depth of Knowledge Required	**WP1:** Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamentals-based, first principles analytical approach	**SP1:** Cannot be resolved without engineering knowledge at the level of one or more of SK 4, SK5, and SK6 supported by SK3 with a strong emphasis on the application of developed technology	**DP1:** Cannot be resolved without extensive practical knowledge as reflected in DK5 and DK6 supported by theoretical knowledge defined in DK3 and DK4

Range of conflicting requirements	**WP2:** Involve wide-ranging or conflicting technical, engineering and other issues	**SP2:** Involve a variety of factors which may impose conflicting constraints	**DP2:** Involve several issues, but with few of these exerting conflicting constraints
Depth of analysis required	**WP3:** Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models	**SP3:** Can be solved by application of well-proven analysis techniques	**DP3:** Can be solved in standardised ways
Familiarity of issues	**WP4:** Involve infrequently encountered issues	**SP4:** Belong to families of familiar problems which are solved in well-accepted ways	**DP4:** Are frequently encountered and thus familiar to most practitioners in the practice area
Extent of applicable codes	**WP5:** Are outside problems encompassed by standards and codes of practice for professional engineering	**SP5:** May be partially outside those encompassed by standards or codes of practice	**DP5:** Are encompassed by standards and/or documented codes of practice
Extent of stakeholder involvement and conflicting requirements	**WP6:** Involve diverse groups of stakeholders with widely varying needs	**SP6:** Involve several groups of stakeholders with differing and occasionally conflicting needs	**DP6:** Involve a limited range of stakeholders with differing needs
Interdependence	**WP7:** Are high level problems including many component parts or sub-problems	**SP7:** Are parts of, or systems within complex engineering problems	**DP7:** Are discrete components of engineering systems

PART B: SPECIFIC ACCREDITATION REQUIREMENTS FOR THE ACCREDITATION OF PROGRAMMES TO AN INTERNATIONAL ACCORD STANDARD

1. PROGRAMME GRADUATE OUTCOMES

1.1 A set of Programme Graduate Outcomes are defined for the programme

1.2 Programme Graduate Outcomes are substantially equivalent to the exemplar Graduate Attributes of the relevant Accord, but may also be customised to meet the advice of likely employers and target industries

1.3 The programme provides for the progressive development and assessment of the relevant set of Graduate Attributes. The Graduate Attributes for each International Accord are set out below along with indicators of attainment to guide interpretation.

	Washington Accord	Sydney Accord	Dublin Accord
1.3.1 Engineering Knowledge	WA1: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems	SA1: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in SK1 to SK4 respectively to defined and applied engineering procedures, processes, systems or methodologies	DA1: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in DK1 to DK4 respectively to wide practical procedures and practices
1.3.2 Problem analysis ***Complexity of analysis***	WA2: Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural	SA2: Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to the	DA2: Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

	Washington Accord	Sydney Accord	Dublin Accord
	sciences and engineering sciences (WK1 to WK4) *Indicators of attainment* • Identifies all relevant constraints and requirements and formulates an accurate description of the problem • Gathers engineering knowledge from the open literature and discerns the most relevant • Develops from the qualitative description of the problem mathematical, physical or computational models/solutions based on fundamental principles and justifiable assumptions • Selects appropriate analysis tools and applies those proficiently to implement the model/solution • Evaluates the analysis for accuracy and validity of assumptions made	discipline or area of specialisation (SK1 to SK4) *Indicators of attainment* • Identifies relevant constraints and requirements and develops an accurate description of the problem • Gathers engineering knowledge from sources such as textbooks, reviews, codes of practice and standards and identifies the most relevant • Selects from the qualitative description of the problem a suitable form of mathematical, physical or computation model and justifies that choice • Selects appropriate analysis tools, which may include relevant standards and codes of practice, and applies those proficiently to implement the model • Systematically checks the analysis for accuracy and validity of assumptions made	*Indicators of attainment* • Identifies relevant constraints and requirements and sets out an accurate description of the problem • Gathers engineering knowledge from sources such as standards and codes of practice and identifies the most relevant • Applies established diagnostic processes and codified methods to define problems • Systematically checks the analysis for accuracy and validity of assumptions made
1.3.3 Design/development of solutions	WA3: Design solutions for complex engineering problems and design	SA3: Design solutions for broadly-defined engineering technology	DA3: Design solutions for well-defined technical problems and assist with the

	Washington Accord	Sydney Accord	Dublin Accord
Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5) *Indicators of attainment* • Identifies all relevant constraints and requirements • Identifies information requirements and selects what is relevant from the open literature • Demonstrates creativity when proposing possible solutions • Screens alternative solutions systematically • Applies modern design theories and methodologies to develop/design possible solutions • Evaluates the feasibility of several possible solutions in all relevant contexts which, as appropriate to the problem, may include: technical, suitability for implementation, economic, aesthetic, ethical, health and safety, societal, environmental and cultural	problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (SK5) *Indicators of attainment* • Identifies all relevant constraints and requirements • Identifies information requirements and obtains information from the relevant industry literature • Demonstrates creativity to propose possible solutions • Screens alternative solutions systematically • Develops/designs at least two possible solutions • Evaluates the feasibility of possible solutions in the most relevant contexts which, as appropriate to the problem, include some of technical, suitability for implementation, economic, aesthetic, ethical, health and	design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5) *Indicators of attainment* • Identifies relevant practical constraints and requirements • Identifies information requirements and obtains information from the relevant industry literature • Demonstrates creativity to propose possible solutions • Screens alternative solutions systematically • Develops/designs at least one possible solution • Considers contextual factors and in particular ensures that health, safety and sustainability imperatives are addressed as an integral part of the design process • Makes informed choices between alternatives and justifies approach.

	Washington Accord	Sydney Accord	Dublin Accord
	• Undertakes analysis to confirm the robustness of the proposed solution in the light of uncertain information and data • Describes the preferred solution and presents the findings in a coherent written form and defends those findings orally	safety, societal, environmental and cultural • Makes informed choices between alternatives based on sound analysis • Evaluates the robustness of the proposed solution in the light of uncertain information and data • Documents a preferred solution and presents the findings in a coherent written form	• Verifies the robustness of the proposed solution against clearly specified user requirements • Documents a preferred solution and presents the findings in a coherent written form
1.3.4 Investigation ***Breadth and depth of investigation and experimentation***	WA4: Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions *Indicators of attainment* • Reviews the open research literature • Identifies the needs for research or investigation • Identifies appropriate research or investigation methodologies	SA4: Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature (SK8), design and conduct experiments to provide valid conclusions *Indicators of attainment* • Reviews relevant textbooks, databases and guidance documents • Identifies the needs for investigation • Identifies an appropriate investigation methodology	*DA4: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements* *Indicators* of attainment • Reviews relevant textbooks, databases and guidance documents • Identifies the needs for data collection and/or testing • Identifies an appropriate data collection or testing methodology

	Washington Accord	Sydney Accord	Dublin Accord
	• Designs and executes valid forms of research, experimentation or measurement • Calibrates/validates the data collection methods and equipment • Analyses the data including considering sources of error • Draws valid conclusions and justifies those conclusions	• Designs and executes valid forms of experimentation or measurement • Calibrates/validates the data collection methodology and equipment • Analyses the data including considering sources of error • Draws valid conclusions	• Selects and applies established methods of data collection and measurement • Safely implements laboratory test and measurement procedures • Calibrates/validates the data collection methods and equipment • Analyses the data including considering sources of error • Draws valid conclusions
1.3.5 Modern tool usage ***Level of understanding of the appropriateness of the tool***	WA5: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6) *Indicators of attainment* • Identifies the range of current tools available, selects one or more suitable tools and justifies the selection including considerations of the limitations of the tools available • Applies such tools, checks the results for validity, evaluates	SA5: Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations (SK6) *Indicators of attainment* • Understands the range of tools available, selects a suitable tool and justifies the selection including consideration of the limitation of the tools available • Applies such tools, checks results for validity, draws and explains conclusions and limitations on those conclusions	DA5: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6) *Indicators of attainment* • Understands the range of tools available, selects a suitable tool and explains the selection including consideration of the limitation of the tools available • Applies such tools, check the results for validity, identifies and draws conclusions and limitations on those conclusions

	Washington Accord	Sydney Accord	Dublin Accord
	conclusions and the limitations on those conclusions		
1.3.6 The engineer and society ***Level of knowledge and responsibility***	WA6: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7) *Indicators of attainment* • Identifies the responsibilities of a professional engineer generally, and demonstrates an awareness of the issues associated with international engineering practice and global operating contexts • Evaluates the impacts of any relevant legislation or regulations and justifies relevant steps to be taken to ensure compliance • Identifies risks, develops and evaluates risk management strategies to minimise the likelihood of significant consequences (such as injury or loss of life, major environmental damage, or significant economic	SA6: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly defined engineering problems (SK7) *Indicators of attainment* • Identifies the responsibilities of an engineering technologist generally • Identifies the impacts of any relevant legislation or regulation and sets out relevant steps to be taken to ensure compliance • Identifies risks and develops risk management strategies to minimise the likelihood of significant consequences (such as injury or loss of life, major environmental damage, or significant economic loss) occurring in the event of failure, unusual or unexpected circumstances	DA6: Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well defined engineering problems (DK7) *Indicators of attainment* • Demonstrates knowledge of the responsibilities of an engineering technician generally • Demonstrates knowledge of the impacts of any relevant legislation or regulation and identifies relevant steps to be taken to ensure compliance • Applies established risk management strategies to minimise the likelihood of significant consequences (such as injury or loss of life, major environmental damage, or significant economic loss) occurring in the event of failure

	Washington Accord	Sydney Accord	Dublin Accord
	loss) occurring in the event of failure, unusual or unexpected circumstances • Identifies the relevant steps to be undertaken to address cultural (including Treaty of Waitangi) or community concerns • Identifies hazards and justifies relevant strategies and systems to reasonably assure public health and safety (including as appropriate to the discipline, safety in construction/fabrication, operation, maintenance, deconstruction/disposal, failing-safe and occupational health and safety)	• Identifies the relevant steps to be undertaken to address cultural (including Treaty of Waitangi) or community concerns • Identifies hazards and explains relevant steps to be taken to reasonably assure public health and safety (including as appropriate to the discipline, safety in construction/fabrication, operation, maintenance, deconstruction/disposal, failing-safe and occupational health and safety)	• Identifies the relevant steps to be undertaken to address cultural (including Treaty of Waitangi) or community concerns • Identifies operational hazards and sets out relevant steps to be taken to lower the risk to public health and safety (including as appropriate to the discipline, safety in construction/fabrication, operation, maintenance, deconstruction/disposal, failing-safe and occupational health and safety)
1.3.7 Environment and sustainability ***Type of solutions***	WA7: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts (WK7) *Indicators of attainment* • Identifies both direct and indirect and short and long term impacts (including through Treaty of	SA7: Understand and evaluate the sustainability and impact of engineering technology work in the solution of broadly defined engineering problems in societal and environmental contexts (SK7) *Indicators of attainment* • Identifies both direct and indirect impacts on people (including	DA7: Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7) *Indicators of attainment* • Identifies practical impacts on people (including through Treaty

	Washington Accord	Sydney Accord	Dublin Accord
	Waitangi obligations) on people and the environment • Identifies and justifies specific actions required for environmental protection in the event of failure • Undertakes life-cycle analysis to determine the sustainability of any proposed outcomes	through Treaty of Waitangi obligations) and the environment • Identifies and explains means for ensuring environmental protection in the event of failure • Identifies and evaluates the major factors that have impact on the sustainability of any proposed outcomes	of Waitangi obligations) and the environment • Applies established methods for ensuring environmental protection in the event of failure • Identifies the major factors that have impacts on the sustainability of practical and technical project work
1.3.8 Ethics ***Understanding and level of practice***	WA8: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7). Indicators of attainment • Demonstrates an understanding of the moral responsibilities of a professional engineer including: the need to self-manage in an orderly and ethical manner, to balance the wider public interest with the interests of employers and clients, and to uphold standards in the engineering profession • Identifies and justifies ethical courses of action when confronted with complex situations that might	SA8: Understand and commit to professional ethics and responsibilities and norms of engineering technology practice (SK7) *Indicators of attainment* • Demonstrates an understanding of the moral responsibilities of an engineering technologist including: the need to self-manage in an orderly and ethical manner, to balance the wider public interest with the interests of employers and clients, and to uphold standards in the engineering profession • Identifies ethical courses of action when confronted with situations	DA8: Understand and commit to professional ethics and responsibilities and norms of technician practice (DK7) *Indicators of attainment* • Demonstrates an understanding of the moral responsibilities of an engineering technician including: the need to self-manage in an orderly and ethical manner, to balance the wider public interest with the interests of employers and clients, and to uphold standards in the engineering profession • Identifies relevant clauses in the Engineering New Zealand code of ethics when confronted with

	Washington Accord	Sydney Accord	Dublin Accord
	arise in the work of a professional engineer	that might arise in the work of an engineering technologist	situations that might arise in the work of an engineering technician
1.3.9 Individual and teamwork ***Role in and diversity of team***	WA9: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings *Indicators of attainment* • Manages own activities with honesty and integrity and in an orderly manner to meet deadlines • Contributes constructively to team decision making, earns the trust and confidence of other team members • Provides leadership in a team environment by making informed decisions, keeping the team motivated and accepting and delegating responsibility	SA9: Function effectively as an individual, and as a member or leader in diverse teams *Indicators of attainment* • Manages own activities with honesty and integrity and in an orderly manner to meet deadlines • Contributes constructively to team decision making, earns the trust and confidence of other team members • Provides leadership in a team environment by making informed decisions, keeping the team motivated and accepting and delegating responsibility	DA9: Function effectively as an individual, and as a member in diverse technical teams *Indicators of attainment* • Manages own activities with honesty and integrity and in an orderly manner to meet deadlines • Contributes constructively to team decision making, earns the trust and confidence of other team members
1.3.10 Communication ***Level of communication according to type pf activities performed***	WA10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation,	SA10: Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation,	DA10: Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions

	Washington Accord	Sydney Accord	Dublin Accord
	make effective presentations, and give and receive clear instructions *Indicators of attainment* • Presents a range of written reports and other documentation relevant to the engineering discipline that convey information effectively to both technical and non-technical audiences. • Presents work verbally in a clear and articulate manner, using visual aids appropriately in a range of contexts • Comprehends and responds appropriately to written and verbal instructions and appropriately instructs or briefs others in group exercises • Produces engineering specifications or design documentation that satisfy the requirements of the design brief	make effective presentations, and give and receive clear instructions *Indicators of attainment* • Presents clearly written reports for both technical and lay audiences, as is appropriate • Presents work verbally in a clear and articulate manner, using visual aids appropriately • Comprehends and responds appropriately to written and verbal instructions and appropriately instructs or briefs others in group exercises • Produces engineering specifications or design documentation that satisfy the requirements of the design brief	*Indicators of attainment* • Presents clearly written reports for both technical and lay audiences, as is appropriate • Presents work verbally in a clear and articulate manner, using visual aids appropriately • Comprehends and responds appropriately to written and verbal instructions and appropriately instructs or briefs others in group exercises • Prepares engineering documents including sketches, charts, plans, drawings and technical instructions
1.3.11 Project Management and finance ***Level of management required for differing types of activity***	WA11: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member or	SA11: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to manage	DA11: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to

	Washington Accord	Sydney Accord	Dublin Accord
	leader in a team, to manage projects and in multidisciplinary environments *Indicators of attainment* • Comprehends how legislative, regulatory, contract law, other common law and professional obligations apply and manages own activities to comply • Selects and applies relevant project management techniques to the planning and execution of future work • Selects and justifies appropriate forms of contract for delivery of work by consultants or contractors • Selects and applies relevant systems or techniques for managing quality, reliability and risk in the context of engineering projects • Estimates the capital and on-going costs of engineering work	projects in multidisciplinary environments *Indicators of attainment* • Comprehends how legislative, regulatory, contract law, other common law and professional obligations apply and manages own activities to comply • Selects and applies relevant project management techniques to the planning and execution of future work • Selects appropriate forms of contract for delivery of work by consultants or contractors • Selects relevant techniques for managing quality, reliability and engineering risk • Estimates the capital and on-going costs of engineering work	manage projects in multidisciplinary environments *Indicators of attainment* • Comprehends how legislative, regulatory, contract law, other common law and professional obligations apply and manages own activities to comply • Selects and applies basic project management tools to the planning and execution of practical project work • Identifies an appropriate form of contract for delivery of work by contractors • Identifies relevant practical methods for managing quality, reliability and engineering risk • Applies established methods for costing engineering work
1.3.12 Lifelong learning **Preparation for and depth of continuing learning**	WA12: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	SA12: Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies	DA12: Recognize the need for, and have the ability to engage in independent updating in the context of specialized technical knowledge

	Washington Accord	Sydney Accord	Dublin Accord
	Indicators of attainment • Applies independent learning practices • Demonstrates self-awareness of own level of competence and identifies opportunities to extend own competence in a timely manner • Comprehends the importance of engaging with a professional and intellectual community, learning from its knowledge and standards, and contributing to their maintenance and advancement	*Indicators of attainment* • Applies independent learning practices • Demonstrates self-awareness of own level of competence and identifies opportunities to extend own competence in a timely manner • Comprehends the importance of engaging with a professional community, learning from its knowledge and standards	*Indicators of attainment* • Applies independent learning practices • Demonstrates self-awareness of own level of competence and identifies opportunities to extend own competence in a timely manner • Comprehends the importance of engaging with a professional community, learning from its knowledge and standards

Note: For programmes to be accredited at the Washington Accord level, the Design Project (1.3.3) and Student Research (1.3.4) components may be organised into separate courses or within a single course/project, which has distinct research and design elements, in which case the overall project is expected to be of at least 45 and ideally 60 credits in size.

2. PROGRAMME DESIGN

		Washington Accord	Sydney Accord	Dublin Accord
2.1		The programme is structured to provide for the logical, progressive development of programme graduate outcomes and embedded elements of the relevant knowledge profile		
2.2		The programme is structured to provide a systematic coverage of the coherent body of knowledge related to a particular branch of engineering		
2.3		The programme title is consistent with the underpinning body of knowledge covered by the programme		
2.4		The programme design is customised taking into account the advice of likely employers and target industries, this advice obtained through a structured advisory mechanism		
2.5	Design Project	The programme includes integrative project work in which the assessment of the student is against a range of overall programme graduate outcomes, which must include design or development of solutions (see note below)	The programme includes integrative project work in which the assessment of the student is against a range of overall programme graduate outcomes, which must include investigation and design or development of solutions either in separate projects or integrated into a single project of at least 30 credits	The programme includes integrative project work in which the assessment of the student is against a range of overall programme graduate outcomes, which must include investigation and design or development of solutions either in separate projects or integrated into a single project of at least 15 credits
2.6	Student research	The programme includes sufficient individual research work to satisfy requirements for the award of an Honours degree (see note below)	N/A	N/A

2.7	Practical work experience in industry	Students undertake supervised or monitored, assessed and employer verified work in industry, equivalent to two work placements of around 400 hours each and critically reflect and report on how that experience has contributed to their development, as measured against programme-level graduate attributes.	N/A	N/A

Note: Ideally, all work experience will have a direct link to professional engineering work or an engineering-based industry and might include practical workshop or site-based work. However, a university may choose to accept up to 400 hours from general work experience. Work experience may occur on a full-time or part-time basis and can include work within the University in support of academic research projects (particularly for students contemplating postgraduate study and/or an academic or research-based career).

3. ASSESSMENT TO ACHIEVE THE DESIRED OUTCOMES

	Washington Accord	Sydney Accord	Dublin Accord
3.1	There are specific and appropriate assessment processes to measure graduate capability and performance relative to the programme graduate outcomes		
3.2	Assessment tools within each course are suitably chosen in relation to the learning outcomes and validly assess the contribution made to the development of programme graduate outcomes for the programme as a whole. (See WA5, SA5, DA5 for clarification on the distinction between modern/engineering tools		
3.3	The provider is able to identify specific assessment activities that demonstrate students' achievement of each of the relevant Accord Graduate Attributes		

4. CAPACITY AND CAPABILITY

4.1 Academic staff

	Washington Accord	Sydney Accord	Dublin Accord
4.1.1	The academic staff devoted to the programme are sufficient to cover, in terms of experience and interest, all relevant subjects		
4.1.2	There are sufficient full-time staff to provide the necessary levels of student interaction and mentoring, and staff participation in developing, controlling and administering the programme		
4.1.3	Academic staffing and teaching loads allow adequate interaction with students, support the range of learning experiences offered and to allow adequate opportunity for professional engagement outside of academia		
4.1.4	A high proportion of staff possess appropriate academic qualifications in engineering, and experience in industry and/or engineering research	A high proportion of staff possess appropriate academic, professional and experiential backgrounds in engineering	A high proportion of staff possess appropriate academic, professional and experiential backgrounds in engineering
4.1.5	The academic team demonstrates active commitment to the New Zealand engineering profession ***Evidence of this will include individual staff:*** • Extending the engineering body of knowledge through the peer-reviewed publication of research outputs, and • Maintaining membership of and active participation in the most relevant professional body (note: membership of international learned societies that do not	The academic team demonstrates active commitment to the New Zealand engineering profession ***Evidence of this will include individual staff:*** • Maintaining membership of and active participation in the most relevant professional body (note: membership of international learned societies that do not maintain active local programmes would not, of itself, be counted in this context) and/or	The academic team demonstrates active commitment to the New Zealand engineering profession ***Evidence of this will include individual staff:*** • Maintaining membership of and active participation in the most relevant professional body (note: membership of international learned societies that do not maintain active local programmes would not, of itself, be counted in this context) and/or

	maintain active local programmes would not, of itself, be counted in this context) and/or • Contributing to the development of engineering practice in NZ through such things as: ○ The delivery of industry conference presentations, technical seminars or workshops, ○ Consultancy/contracting work with industry ○ Participating in working parties to develop codes of practice or standards ○ Expert witness work ○ Participating as practice area assessors in New Zealand competence assessment processes ○ Participating as panel members on New Zealand accreditation activities ○ Active engagement in advancing engineering education practice	• Contributing to the development of engineering practice in NZ through such things as: ○ The publication or dissemination of research outputs ○ The delivery of industry conference presentations, technical seminars or workshops, ○ Consultancy/contracting work with industry ○ Participating in working parties to develop codes of practice or standards ○ Expert witness work ○ Participating as practice area assessors in New Zealand competence assessment processes ○ Participating as panel members on New Zealand accreditation activities ○ Active engagement in advancing engineering education practice	• Contributing to the development of engineering practice in NZ through such things as: ○ Consultancy/contracting work with industry ○ Participating in working parties to develop codes of practice or standards ○ Expert witness work ○ Participating as practice area assessors in New Zealand competence assessment processes ○ Participating as panel members on New Zealand accreditation activities ○ Active engagement in advancing engineering education practice
4.1.6	Key academic staff teaching key design project courses are currently competent professional engineers in the New Zealand context as judged by peers in the wider engineering profession. Good evidence of this would include formal recognition within the engineering profession through recent success in a competence assessment e.g. for CPEng or CMEngNZ	Key academic staff teaching design key project courses are currently competent engineers in the New Zealand context as judged by peers in the wider engineering profession. Good evidence of this would include formal recognition within the engineering profession through recent success in a competence assessment e.g. for CPEng or CMEngNZ	Key academic staff teaching key design project courses are currently competent engineers in the New Zealand context as judged by peers in the wider engineering profession. Good evidence of this would include formal recognition within the engineering profession through recent success in a competence assessment e.g. for CPEng or CMEngNZ

Note: In evaluating academic staffing, benchmarking with other national and international institutions may be considered and provision of such evidence is encouraged

4.2 Technical and support staff

	Washington Accord	Sydney Accord	Dublin Accord
4.2.1	There are sufficient, competent technical and support staff to service practical teaching facilities and ensure student project work can include design, construction and testing of processes, artefacts, systems or structures		

4.3 Practical teaching facilities and learning resources

	Washington Accord	Sydney Accord	Dublin Accord
4.3.1	There is sufficient capacity and appropriately equipped practical teaching facilities, reflecting current and emerging technologies, to support students' practical and project-based study		
4.3.2	There is a sufficient financial commitment to on-going renewal of equipment, software and other resources		
4.3.3	Health and safety policies and practices in practical teaching spaces satisfy legal requirements, are in line with good practice in industry, are actively enforced, and encourage an active, pre-emptive culture towards safety amongst students		
4.3.4	Students have access to sufficient literature and computer resources to support their learning		
4.3.5	Sufficient space and equipment is provided for the investigative/research/design projects undertaken by students	Sufficient space and equipment is provided for the investigative projects undertaken by students	Sufficient space and equipment is provided for the projects undertaken by students
4.3.6	Students have independent access to facilities and work areas that support project/research based and personal study	Students have independent access to facilities and work areas to support project/research based and personal study	Students have independent access to facilities and work areas to support project work and personal study

Note: If the provision of the programme uses distance learning or block course teaching off-site the performance indicators are interpreted by considering whether the support facilities, as experienced from the student perspective sufficiently provide a suitable learning environment.

4.4 Educational and professional culture

	Washington Accord	Sydney Accord	Dublin Accord
4.4.1	A culture of professionalism is pervasive, exemplified by: • Consistent role-modelling of professional behaviour and support for professionalism by staff (including absence of unconscious biases based on gender or ethnicity) • Active support for relevant professional bodies and learned societies to engage with students • Staff facilitating student societies/groups that run beneficial collegial activities amongst the student cohort • Clear focus on the continuous improvement of teaching and learning practices including support for academic staff to engage in engineering education research and apply current tertiary teaching pedagogies		

5. QUALITY ASSURANCE AND MANAGEMENT SYSTEMS

5.1 Admission standards

	Washington Accord	Sydney Accord	Dublin Accord
5.1.1	Admission standards are in place to ensure students have the educational background needed to have a reasonable chance of succeeding in their first year of study, and thereby progress through the programme. The suitability of the admission standard is reflected in student retention rates		
5.1.2	Different entry points and pathways are available for applicants with appropriate prior learning and/or experience		
5.1.3	Admission standards require sufficient proficiency in both written and oral English, and students admitted with marginal English language proficiency receive appropriate support		

5.1.4	Programmes are in place to support groups of students with specific needs and to address issues that limit the participation by under-represented groups of students

5.2 Quality systems and processes

	Washington Accord	Sydney Accord	Dublin Accord
5.2.1	There are documented processes for developing new programmes which cover programme planning, curriculum development and programme approval		
5.2.2	There are documented processes for the ongoing review and amendment of programmes and their delivery and assessment		
5.2.3	There are processes for securing feedback and comment from students, graduates, employers of engineers, and representatives of the engineering community; and evidence of their systematic application to the review and continuing improvement of programme objectives, curriculum and content, and the quality of learning and teaching		
5.2.4	There are systems in place to benchmark or seek and have regard to external moderation advice to ensure suitability of the level of attainment required to complete the programme		
5.2.5	There are documented audit processes that ensure the consistent application of documented policies and procedures		

5.3 Management structure

	Washington Accord	Sydney Accord	Dublin Accord
5.3.1	There is an identifiable management structure that ensures engineering expertise is central to decision-making relating to the design, content and delivery of engineering programmes, for managing associated resources and for appointment of staff and supporting professional activity of staff		

5.4 Institutional support

	Washington Accord	Sydney Accord	Dublin Accord
5.4.1	Engineering education is seen as a significant long-term component of the TEOs activity and the commitment to engineering education is supported by preliminary allocation of sufficient financial resources for the remainder of the proposed period of accreditation		
5.4.2	The TEO has adequate arrangements for planning, developing, delivering, and reviewing engineering programmes and for supporting the associated professional activities of staff		
5.4.3	Student: staff ratios and staff workloads are monitored and the institution has adequate policies and mechanisms for funding its engineering programmes and facilitating the generation of funds from external sources; for attracting, appointing, retaining and rewarding sufficient well-qualified staff and providing for their ongoing professional development; and for providing and updating infrastructure and support services		
5.4.4	Creative and strategic leadership is available to the engineering department, school, college or faculty		

PART C: SPECIFIC ACCREDITATION CRITERIA FOR THE ACCREDITATION OF POSTGRADUATE PROGRAMMES BASED ON SPECIFIC BODIES OF KNOWLEDGE

1. PROGRAMME GRADUATE OUTCOMES

1.1 A graduate profile or set of programme-level learning outcomes has been developed, which is aligned with a clearly defined and articulated industry need in a particular area of specialised or advanced engineering practice, including any particular "registration or license to practise" requirements.

1.2 The graduate profile or programme-level learning outcomes incorporate the development of a coherent body of knowledge that is curated by a recognised industry group (that is viewed to own the body of knowledge) as necessary for entry to practice and/or "registration/licensure". It is expected that the industry group is clearly identified and recognised as authoritative or nationally representative of engineering practice in the area. The industry body is also expected to be able to demonstrate the capacity, capability and commitment to maintain the relevant Body of Knowledge over time.

2. PROGRAMME DESIGN

2.1 The programme is structured to provide for the logical, progressive development of the defined graduate profile or programme level learning outcomes.

2.2 The programme is structured to provide a systematic coverage of the body of knowledge to which the programme relates.

2.3 The programme title is consistent with the underpinning body of knowledge covered by the programme.

2.4 The programme design demonstrably takes into account the advice of likely employers and target industries, this advice obtained through a structured advisory mechanism or regular, formal engagement with the recognised industry body responsible for maintaining the Body of Knowledge.

3. ADMISSION STANDARDS

3.1 Admission standards are in place to ensure students have the educational background, including sufficient foundational engineering education at a tertiary level, needed to have a reasonable chance of succeeding in the programme. The suitability of the admission standard is reflected in student completion rates.

3.2 Admission material clearly articulates the relationship between the specialised or advanced body of knowledge developed by the programme and foundational engineering knowledge and skills as typically required for general entry to practice as an engineer.

3.3 Where programme entry criteria provide for the enrolment of students who do not hold an undergraduate engineering qualification recognised as satisfying general entry to practice requirements (typically a programme recognised under the Washington Accord), potential restrictions on future practice or professional registration or licensure are clearly articulated to prospective students.

3.4 Any pre-requisite foundational engineering knowledge is clearly identified and consistently assessed.

One of the risks with postgraduate programmes is the diversity of admission routes. Depending on the TEO's admission policy incoming students may not have an engineering qualification, or may have one in a different engineering discipline, or have one at a different level (e.g. diploma) or may have an overseas qualification. Engineering New Zealand is not prescriptive as to how the TEO determines and enforces its postgraduate admission criteria but does reserve the right not to recognise a graduate within the profession, even if the postgraduate programme has been accredited. Engineering New Zealand expects the TEO to manage this risk at admission and to faithfully communicate the implications to students[1].

4. ASSESSMENT TO ACHIEVE THE DESIRED OUTCOMES

4.1 There must be specific and appropriate assessment processes to measure graduate capability and performance relative to the overall graduate profile.

4.2 Assessment tools within each course are suitably chosen in relation to the learning outcomes and validly assess the contribution made to the development of graduate attributes.

4.3 There are systems in place for external moderation of assessment standards with industry to ensure that the level of attainment required to complete the programme is aligned with industry requirements.

5. ACADEMIC STAFF

5.1 The academic staff devoted to the programme are sufficient to cover, in terms of experience and specialised expertise, all relevant subjects. In the case of those postgraduate programmes where the level of specialisation is high, is it is accepted that individual courses may be critically dependent on individual lecturers. Nonetheless there is a requirement that the programme as a whole will be designed to be viable with respect to the graduate profile if individual academic staff become unavailable.

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[1] As noted in Part A above, programmes accredited under this Part are not recognised under an International Accord , so graduates who do not have a suitable prior engineering qualification are at risk of not being recognised within the profession, for lack of breadth and depth of underpinning engineering knowledge (Item 1 in the IEA graduate attributes). Such graduates may have to undergo an additional individual knowledge assessment as part of the professional recognition/registration/licensing process. For example, if a student with an undergraduate degree in mathematics was admitted to a postgraduate programme accredited under this Part and completed that programme, then the graduate would not necessarily qualify for recognition within the profession, even in the specialised area of practice to which the accredited programme relates.

5.2 There are sufficient full-time staff to provide the necessary levels of student interaction and mentoring, and staff participation in developing, controlling and administering the programme.

5.3 Academic staffing and teaching loads allow adequate interaction with students, support the range of learning experiences offered and allow adequate opportunity for professional engagement outside of academia.

5.4 Staff possess appropriate academic qualifications in engineering, and experience in industry and/or engineering research.

5.5 The academic team demonstrates active commitment to the New Zealand engineering profession. Evidence of this will include individual staff:

- Extending the engineering body of knowledge through the peer-reviewed publication of research outputs, and
- Maintaining membership of and active participation in the most relevant professional body (note: membership of international learned societies that do not maintain active local programmes would not, of itself, be counted in this context), and/or
- Contributing to the development of engineering practice in NZ through such things as:
  - The delivery of industry conference presentations, technical seminars or workshops
  - Consultancy work with industry
  - Participating in working parties to develop codes of practice or standards
  - Expert witness work
  - Participating as practice area assessors in New Zealand competence assessment processes
  - Participating as panel members on New Zealand degree accreditation activities
  - Active engagement in advancing engineering education practice

5.6 Key academic staff teaching key project courses are currently competent professional engineers in the New Zealand context as judged by peers in the wider engineering profession. Good evidence of this would include formal recognition within the engineering profession through recent success in a competence assessment e.g. for CPEng or CMEngNZ.

6. TECHNICAL STAFF

Criterion 4.2 from Part B applies.

7. PRACTICAL TEACHING FACILITIES AND LEARNING RESOURCES

Criterion 4.3 from Part B applies.

8. EDUCATIONAL AND PROFESSIONAL CULTURE

Criterion 4.4 from Part B applies.

Note: this criterion will be deemed to have been met by TEO's holding current Engineering New Zealand programme accreditation at an International Education Accord Level.

9. QUALITY ASSURANCE AND MANAGEMENT SYSTEMS

Criterion 5.1 – 5.4 from Part B apply.

Note: this criterion will be deemed to have been met by TEO's holding current Engineering New Zealand programme accreditation at an International Education Accord Level.