Annex-2 Matrix indicating Requirements Under Each Accords

Roles, Responsibilities and Competencies of each category (to be identified as per IEA Accords)

The Accords in summary specify the 3 categories as follows.

… for Washington Accord Graduate	… for Sydney Accord Graduate	… for Dublin Accord Graduate
Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization as specified in WK1-WK4 respectively to the solution of complex engineering problems.	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization as specified in SK1-SK4 respectively to defined and applied engineering procedures, processes, systems or methodologies.	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization as specified in DK1-DK4 respectively to wide practical procedures and practices.

1. Attributes of an Engineer (as per Washington Accord)

A defining characteristic of professional engineering is the ability to work with complexity and uncertainty, since no real engineering project or assignment is exactly the same as any other (otherwise the solution could simply be purchased or copied). Accordingly, the attributes place as central the notions of complex engineering problems and complex problem solving.

The Washington Accord defines,

a) 12 element Graduate Attribute Profile (WA1-WA12)
b) Knowledge Profile (WK1-WK8)
c) Level of Problem Solving (WP1-WP7 and EP1-EP2)
d) Professional Competency Profile (EC1-EC12)

a) Graduate Attributes

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.
Problem Analysis Complexity of analysis	WA2: Identify, formulate, research literature and analyses complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4).
Design/ development of solutions: 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	WA3: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health, and safety, cultural, societal and environmental considerations (WK5).
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.
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 modeling, to complex engineering problems, with an understanding of the limitations (WK6).

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).
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).
Ethics: Understanding and level of practice	WA8: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7).
Individual and Team work: 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.
Communication: Level of communication according to type of activities performed	WA10: Communicate effectively on complex engineering activities with the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
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 and leader in a team, to manage projects and in multi-disciplinary environments.
Lifelong learning: Preparation for and depth of continuing learning.	WA12: Recognize the need for, and have the preparation and ability to engage in, independent and life-long learning in the broadest context of technological change.

b) Knowledge Profile (8 elements)

WK1	A systematic, theory-based understanding of the natural sciences applicable to the 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.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering 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.
WK5	Knowledge that supports engineering design in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
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; and the impacts of engineering activity – economic, social, cultural, environmental and sustainability.
WK8	Engagement with selected knowledge in the research literature of the discipline.

Complex engineering problems have a range of attributes. At least some of the following may be encountered within a professional engineering education programme.

c) Level of Problem Solving (9 items)

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.
Range of conflicting requirements	WP2: Involve wide-ranging or conflicting technical, engineering and other issues.
Depth of analysis required	WP3: Have no obvious solution and require abstract thinking and originality in analysis to formulate suitable models.
Familiarity of issues	WP4: Involve infrequently encountered issues.
Extent of applicable codes	WP5: Outside problems encompassed by standards and codes of practice for professional engineering.
Extent of stakeholder involvement and needs	WP6: Involve diverse groups of stakeholders with widely varying needs.
Interdependence	WP 7: High level problems including many component parts or sub-problems.
Consequences	EP1: Have significant consequences in a range of contexts

Judgment	EP2: Require judgment in decision making

d) Professional Competency Profile

Differentiating Characteristic	Professional Engineer
Comprehend and apply universal knowledge: Breadth and depth of education and type of knowledge	**EC1:** Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice
Comprehend and apply local knowledge: Type of local knowledge	**EC2:** Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice specific to the jurisdiction in which he/she practices.
Problem analysis: Complexity of analysis	**EC3: Define, investigate and analyses complex problems**
Design and development of solutions: Nature of the problem and uniqueness of the solution	**EC4: Design or develop solutions to complex problems**
Evaluation: Type of activity	**EC5:** Evaluate the outcomes and impacts of complex activities
Protection of society: Types of activity and responsibility to public	**EC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of complex activities generally, and have regard to the need for sustainability; recognize that the protection of society is the highest priority
Legal and regulatory: No differentiation in this characteristic	**EC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities
Ethics: No differentiation in this characteristic	**EC8:** Conduct his or her activities ethically
Manage engineering activities: Types of activity	**EC9:** Manage part or all of one or more complex activities
Communication: No differentiation in this characteristic	**EC10:** Communicate clearly with others in the course of his or her activities
Lifelong learning: Preparation for and depth of continuing learning.	**EC11:** Undertake CPD activities sufficient to maintain and extend his or her competence
Judgment: Level of developed knowledge, and ability and judgment in relation to type of activity	**EC11:** Recognize complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgment in the course of his or her complex activities
Responsibility for decisions: Type of activity for which responsibility is taken	**EC12:** Be responsible for making decisions on part or all of complex activities

2. Engineering Technologist (As per Sydney Accord)

The Sydney Accord defines,

a) 12 element Graduate Attribute Profile (SA1 – SA12)
b) Knowledge Profile (SK1-SK8)
c) Level of Problem Solving (SP1-SP7 and TP1 – TP2)
d) Professional Competency Profile (TC1-TC13)

a) Graduate Attributes

Engineering Knowledge:	**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.
Problem Analysis Complexity of analysis	**SA2:** Identify, formulate, research literature and analyses *broadly-defined* engineering problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialization. (SK1 to SK4)
Design/ development of solutions: 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	**SA3:** Design solutions for *broadly- defined* engineering technology 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)

Investigation: Breadth and depth of investigation and experimentation	**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.
Modern Tool Usage: Level of understanding of the appropriateness of the tool	**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)
The Engineer and Society: Level of knowledge and responsibility	**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)
Environment and Sustainability: Type of solutions.	**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)
Ethics: Understanding and level of practice	**SA8:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7)
Individual and Team work: Role in and diversity of team	**SA9:** Function effectively as an individual, and as a member or leader in diverse teams.
Communication: Level of communication according to type of activities performed	**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, make effective presentations, and give and receive clear instructions
Project Management and Finance: Level of management required for differing types of activity	**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 projects in multidisciplinary environments.
Lifelong learning: Preparation for and depth of continuing learning.	**SA12:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

b) Knowledge Profile (8 elements)

SK1	A systematic, theory-based understanding of the **natural sciences** applicable to the sub-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
SK3	A systematic , theory-based formulation of **engineering fundamentals** required in an accepted sub-discipline
SK4	Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for an accepted sub-discipline
SK5	**Knowledge** that supports **engineering design** using the technologies of a practice area
SK6	Knowledge of **engineering technologies** applicable in the sub-discipline
SK7	**Comprehension of** the role of technology in society and identified issues in applying engineering technology: ethics and impacts: economic, social, environmental and sustainability
SK8	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 3 to 4 years of study, depending on the level of students at entry.

c) Level of Problem Solving (9 items)

Attribute	***Broadly-defined Engineering Problems* have characteristic SP1 and some or all of SP2 to SP7*:***
Depth of Knowledge Required	**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
Range of conflicting requirements	**SP2:** Involve a variety of factors which may impose conflicting constraints
Depth of analysis required	**SP3:** Can be solved by application of well-proven analysis techniques
Familiarity of issues	**SP4:** Belong to families of familiar problems which are solved in well-accepted ways
Extent of applicable codes	**SP5:** May be partially outside those encompassed by standards or codes of practice
Extent of stakeholder involvement and conflicting requirements	**SP6:** Involve several groups of stakeholders with differing and occasionally conflicting needs
Interdependence	**SP7:** Are parts of, or systems within complex engineering problems
Consequences	**TP1:**Have consequences which are important locally, but may extend more widely
Judgment	**TP2**: Require judgment in decision making

d) Professional Competency Profile

Differentiating Characteristic	Engineering Technologist
Comprehend and apply universal knowledge: Breadth and depth of education and type of knowledge	**TC1:** Comprehend and apply the knowledge embodied in widely accepted and applied procedures, processes, systems or methodologies
Comprehend and apply local knowledge: Type of local knowledge	**TC2:** Comprehend and apply the knowledge embodied procedures, processes, systems or methodologies that is specific to the jurisdiction in which he/she practices.
Problem analysis: Complexity of analysis	**TC3:** Identify, clarify, and analyses broadly-defined problems
Design and development of solutions: Nature of the problem and uniqueness of the solution	**TC4:** Design or develop solutions to broadly-defined problems
Evaluation: Type of activity	**TC4:** Evaluate the outcomes and impacts of broadly defined activities
Protection of society: Types of activity and responsibility to public	**TC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of broadly-defined activities generally, and have regard to the need for sustainability; take responsibility in all these activities to avoid putting the public at risk.
Legal and regulatory: No differentiation in this characteristic	**TC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities
Ethics: No differentiation in this characteristic	**TC8: Conduct his or her activities ethically**
Manage engineering activities: Types of activity	**TC9:** Manage part or all of one or more broadly-defined activities
Communication: No differentiation in this characteristic	**TC10:** Communicate clearly with others in the course of his or her activities
Lifelong learning: Preparation for and depth of continuing learning.	**TC11:** Undertake CPD activities sufficient to maintain and extend his or her competence
Judgement: Level of developed knowledge, and ability and judgement in relation to type of activity	**TC12:** Choose appropriate technologies to deal with broadly defined problems. Exercise sound judgement in the course of his or her broadly-defined activities
Responsibility for decisions: Type of activity for which responsibility is taken	**TC13:** Be responsible for making decisions on part or all of one or more broadly defined activities

3. Engineering Technician (As per Dublin Accord)

The Dublin Accord defines,

a) 12 element Graduate Attribute Profile (DA1 – DA12)
b) Knowledge Profile (DK1-DK8)
c) Level of Problem Solving (DP1-DP7 and NP1)
d) Professional Competency Profile (NC1-NC13)

a) Graduate Attributes

Engineering Knowledge	**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.
Problem Analysis Complexity of analysis	**DA2:** Identify and analyses *well-defined* engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity. (DK1 to DK4)
Design/ development of solutions: 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	**DA3:** Design solutions for *well-defined* technical problems and *assist with* the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (DK5)
Investigation: Breadth and depth of investigation and experimentation	**DA4:** Conduct investigations of *well-defined* problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.
Modern Tool Usage: Level of understanding of the appropriateness of the tool	**DA5:** Apply appropriate techniques, resources, and modern engineering and IT tools to *well-defined* engineering problems, with an awareness of the limitations. (DK6)

The Engineer and Society: Level of knowledge and responsibility	**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)
Environment and Sustainability: Type of solutions.	**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)
Ethics: Understanding and level of practice	**DA8:** Understand and commit to professional ethics and responsibilities and norms of technician practice. (DK7)
Individual and Team work: Role in and diversity of team	**DA9:** Function effectively as an individual, and as a member in diverse technical teams.
Communication: Level of communication according to type of activities performed	**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
Project Management and Finance: Level of management required for differing types of activity	**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 manage projects in multidisciplinary environments
Lifelong learning: Preparation for and depth of continuing learning.	**DA12:** Recognize the need for, and have the ability to engage in independent updating in the context of specialized technical knowledge.

b) Knowledge Profile (8 elements)

DK1	A descriptive, formula-based understanding of the **natural sciences** applicable in a sub-discipline
DK2	Procedural **mathematics**, numerical analysis, statistics applicable in a sub-discipline
DK3	A coherent procedural formulation of **engineering fundamentals** required in an accepted sub-discipline
DK4	Engineering **specialist knowledge** that provides the body of knowledge for an accepted sub-discipline
DK5	**Knowledge** that supports **engineering design** based on the techniques and procedures of a practice area
DK6	Codified **practical engineering knowledge** in recognized practice area.
DK7	**Knowledge** of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts
DK8	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 2 to 3 years of study, depending on the level of students at entry.

c) Level of Problem Solving (8 items)

Attribute	***Well-defined Engineering Problems*** have characteristic DP1 and some or all of DP2 to DP7*:*
Depth of Knowledge Required	**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	**DP2:** Involve several issues, but with few of these exerting conflicting constraints
Depth of analysis required	**DP3:** Can be solved in standardised ways
Familiarity of issues	**DP4:** Are frequently encountered and thus familiar to most practitioners in the practice area
Extent of applicable codes	**DP5:** Are encompassed by standards and/or documented codes of practice
Extent of stakeholder involvement and conflicting requirements	**DP6:** Involve a limited range of stakeholders with differing needs
Interdependence	**DP7:** Are discrete components of engineering systems
Consequences	**NP1:** Have consequences which are locally important and not far-reaching

d) Professional Competency Profiles

Differentiating Characteristic	**Engineering Technician**
Comprehend and apply universal knowledge: Breadth and depth of education and type of knowledge	**NC1:** Comprehend and apply knowledge embodied in standardised practices

Comprehend and apply local knowledge: Type of local knowledge	**NC2:** Comprehend and apply knowledge embodied in standardised practices specific to the jurisdiction in which he/she practices.
Problem analysis: Complexity of analysis	**NC3:** Identify, state and analyses well-defined problems
Design and development of solutions: Nature of the problem and uniqueness of the solution	**NC4:** Design or develop solutions to well-defined problems
Evaluation: Type of activity	**NC5:** Evaluate the outcomes and impacts of well-defined activities
Protection of society: Types of activity and responsibility to public	**NC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of well-defined activities generally, and have regard to the need for sustainability; use engineering technical expertise to prevent dangers to the public.
Legal and regulatory: No differentiation in this characteristic	**NC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities
Ethics: No differentiation in this characteristic	**NC8: Conduct his or her activities ethically**
Manage engineering activities: Types of activity	**NC9:** Manage part or all of one or more well-defined activities
Communication: No differentiation in this characteristic	**NC10:** Communicate clearly with others in the course of his or her activities
Lifelong learning: Preparation for and depth of continuing learning.	**NC11:** Undertake CPD activities sufficient to maintain and extend his or her competence
Judgement: Level of developed knowledge, and ability and judgement in relation to type of activity	**NC12:** Choose and apply appropriate technical expertise. Exercise sound judgement in the course of his or her well-defined activities
Responsibility for decisions: Type of activity for which responsibility is taken	**NC13:** Be responsible for making decisions on part or all of all of one or more well-defined activities

Attributes and competencies associated with 3 categories together, would give a proper picture as follows.

a) Graduate Attributes

Differentiating Characteristic	… for Washington Accord Graduate	… for Sydney Accord Graduate	… for Dublin Accord Graduate
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.
Problem Analysis Complexity of analysis	**WA2:** Identify, formulate, research literature and analyses *complex* engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)	**SA2:** Identify, formulate, research literature and analyses *broadly-defined* engineering problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialization. (SK1 to SK4)	**DA2:** Identify and analyses *well-defined* engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity. (DK1 to DK4)
Design/ development of solutions: 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	**WA3:** Design solutions for *complex* engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)	**SA3:** Design solutions for *broadly- defined* engineering technology 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)	**DA3:** Design solutions for *well-defined* technical problems and *assist with* the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (DK5)
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.	**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.	**DA4:** Conduct investigations of *well-defined* problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.
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)	**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)	**DA5:** Apply appropriate techniques, resources, and modern engineering and IT tools to *well-defined* engineering problems, with an awareness of the limitations. (DK6)
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)	**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)	**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)
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)	**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)	**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)
Ethics: Understanding and level of practice	**WA8:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)	**SA8:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7)	**DA8:** Understand and commit to professional ethics and responsibilities and norms of technician practice. (DK7)
Individual and Team work: 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.	**SA9:** Function effectively as an individual, and as a member or leader in diverse teams.	**DA9:** Function effectively as an individual, and as a member in diverse technical teams.

Communication: Level of communication according to type of 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, make effective presentations, and give and receive clear instructions.	**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, make effective presentations, and give and receive clear instructions	**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
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 and leader in a team, to manage projects and in multidisciplinary environments.	**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 projects in multidisciplinary environments.	**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 manage projects in multidisciplinary environments
Lifelong learning: Preparation for and depth of continuing learning.	**WA12:** Recognize 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.

b) Knowledge profile

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 recognized practice area.
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	
A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 4 to 5 years of study, depending on the level of students at entry.	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 3 to 4 years of study, depending on the level of students at entry.	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 2 to 3 years of study, depending on the level of students at entry.

c) Level of Problem solving

Attribute	***Complex Engineering Problems*** have characteristic WP1 and some or all of 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	**WP 7:** 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
In addition, in the context of the Professional Competencies			
Consequences	**EP1: Have significant consequences in a range of contexts**	**TP1:**Have consequences which are important locally, but may extend more widely	**NP1:** Have consequences which are locally important and not far-reaching
Judgment	**EP2: Require judgment in decision making**	**TP2: Require judgment in decision making**	

d) Professional competency profile

Differentiating Characteristic	**Professional Engineer**	**Engineering Technologist**	**Engineering Technician**
Comprehend and apply universal knowledge: Breadth and depth of education and type of knowledge	**EC1:** Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice	**TC1:** Comprehend and apply the knowledge embodied in widely accepted and applied procedures, processes, systems or methodologies	**NC1:** Comprehend and apply knowledge embodied in standardised practices
Comprehend and apply local knowledge: Type of local knowledge	**EC2:** Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice specific to the jurisdiction in which he/she practices.	**TC2:** Comprehend and apply the knowledge embodied procedures, processes, systems or methodologies that is specific to the jurisdiction in which he/she practices.	**NC2:** Comprehend and apply knowledge embodied in standardised practices specific to the jurisdiction in which he/she practices.
Problem analysis: Complexity of analysis	**EC3: Define, investigate and analyses complex problems**	**TC3:** Identify, clarify, and analyses broadly-defined problems	**NC3:** Identify, state and analyses well-defined problems
Design and development of solutions: Nature of the problem and uniqueness of the solution	**EC4: Design or develop solutions to complex problems**	**TC4:** Design or develop solutions to broadly-defined problems	**NC4:** Design or develop solutions to well-defined problems
Evaluation: Type of activity	**EC5:** Evaluate the outcomes and impacts of complex activities	**TC4:** Evaluate the outcomes and impacts of broadly defined activities	**NC5:** Evaluate the outcomes and impacts of well-defined activities

Protection of society: Types of activity and responsibility to public	**EC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of complex activities generally, and have regard to the need for sustainability; recognize that the protection of society is the highest priority	**TC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of broadly-defined activities generally, and have regard to the need for sustainability; take responsibility in all these activities to avoid putting the public at risk.	**NC6:** Recognize the reasonably foreseeable social, cultural and environmental effects of well-defined activities generally, and have regard to the need for sustainability; use engineering technical expertise to prevent dangers to the public.
Legal and regulatory: No differentiation in this characteristic	**EC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities	**TC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities	**NC7:** Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities
Ethics: No differentiation in this characteristic	**EC8:** Conduct his or her activities ethically	**TC8: Conduct his or her activities ethically**	**NC8: Conduct his or her activities ethically**
Manage engineering activities: Types of activity	**EC9:** Manage part or all of one or more complex activities	**TC9:** Manage part or all of one or more broadly-defined activities	**NC9:** Manage part or all of one or more well-defined activities
Communication: No differentiation in this characteristic	**EC10:** Communicate clearly with others in the course of his or her activities	**TC10:** Communicate clearly with others in the course of his or her activities	**NC10:** Communicate clearly with others in the course of his or her activities
Lifelong learning: Preparation for and depth of continuing learning.	**EC11:** Undertake CPD activities sufficient to maintain and extend his or her competence	**TC11:** Undertake CPD activities sufficient to maintain and extend his or her competence	**NC11:** Undertake CPD activities sufficient to maintain and extend his or her competence
Judgment: Level of developed knowledge, and ability and judgment in relation to type of activity	**EC11:** Recognize complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgment in the course of his or her complex activities	**TC12:** Choose appropriate technologies to deal with broadly defined problems. Exercise sound judgment in the course of his or her broadly-defined activities	**NC12:** Choose and apply appropriate technical expertise. Exercise sound judgment in the course of his or her well-defined activities
Responsibility for decisions: Type of activity for which responsibility is taken	**EC12:** Be responsible for making decisions on part or all of complex activities	**TC13:** Be responsible for making decisions on part or all of one or more broadly defined activities	**NC13:** Be responsible for making decisions on part or all of all of one or more well-defined activities

End.