Graduate Attributes and Professional Competency for Engineering Personnel

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Summary

- Modes of Services
- Mobility of Engineering Personnel
- Requirement for Accreditation and International Benchmarking for Independent Practices
- Knowledge Profiles for Engineering Personnel
- Professional Competency of Engineer, Engineering Technologist and Engineering Technician

Modes of Services

(General Agreement on Trade in Services)

Mode 1: Cross-border

- From the territory of one Member into the territory of any other Member

- A user in country A receives services from abroad through its telecommunications or postal infrastructure. Such supplies may include consultancy or market research reports, tele-medical advice, distance training, or architectural drawings.

Modes of Services (Cont'd)

Mode 2: Consumption abroad

- In the territory of one Member to the service consumer of any other Member

- Nationals of A have moved abroad as tourists, students, or patients to consume the respective services.

Modes of Services (Cont'd)

Mode 3: Commercial presence

- By a service supplier of one Member, through commercial presence, in the territory of any other Member

- The service is provided within A by a locally-established affiliate, subsidiary, or representative office of a foreign-owned and — controlled company (bank, hotel group, construction company, etc.)

Modes of Services (Cont'd)

Mode 4: Movement of natural persons

- By a service supplier of one Member, through the presence of natural persons of a Member in the territory of any other Member

- A foreign national provides a service within A as an independent supplier (e.g., consultant, health worker) or employee of a service supplier (e.g. consultancy firm, hospital, construction company)

Global Mobility of Engineering Personnel

- Movement of Globally Engineering Professionals who are capable of Independent Practices
- Examples of Understanding/Agreements for Mobility of Engineering Professionals:

❖ ASEAN Chartered Professional Engineers Register
❖ International Professional Engineers Agreement (formerly EMF)
❖ APEC Engineers Register
❖ International Engineering Technologist Agreement
❖ Agreement for International Engineering Technicians

Mobility Forums

An APEC/IntPE/ACPE Engineer must have have:

- Completed an accredited or recognized engineering program, or assessed recognized equivalent
- Been assessed within their own economy as eligible for independent practice
- Gained a minimum of seven (7) years practical experience since graduation
- Spent at least two(2) years in responsible charge of significant engineering work
- Maintained their continuing professional development at a satisfactory level

Mobility Forums

An APEC/IntPE/ACPE Engineer must also agreed to be:

- Bound by the codes of professional conduct established and enforced by their home jurisdiction and by any other jurisdiction within which they practice

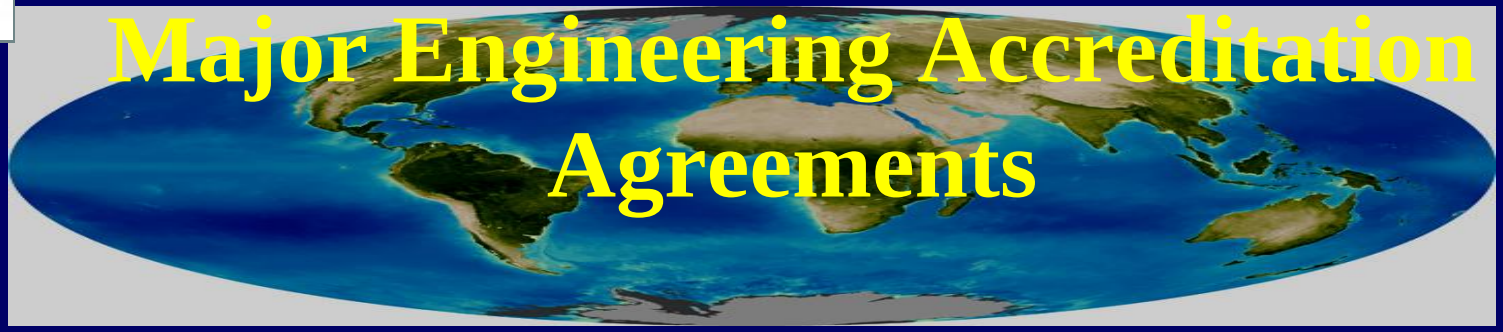
- Held individually accountable for their actions, both through requirements imposed by the licensing or registering body in the jurisdiction in which they work and through legal processes

For Mobility, We need Mutual Recognition and thus Accreditation as Quality Assurance

- International Benchmarking and
  External Recognition of Quality
- For Further Improvement by Faculty
- Give Assurance and Confidence to:
  - Prospective students
  - Graduates
  - Prospective employers
  - Graduate schools
  - Licensing agencies
  - Governments and Funding Agencies

ACCREDITATION is for continuous IMPROVEMENT of DELIVERY of Education for producing HUMAN RESOURCE needed for national development

Major Engineering Accreditation Agreements



- Washington Accord (1989)
- European Network for Accreditation of Engineering Education (ENAEE)
- Regional Accreditation Activities:

  Union Panamericana de Associaciones de Ingenieros (UPADI)

  Federation of Engineering Institutions of Asia and the Pacific (FEIAP)

  Caribbean Accreditation Council for Engineering Technology (CACET)

International Agreements

Other agreements covering mutual recognition in respect of tertiary-level qualifications in engineering:

- *The **Sydney Accord*** commenced in 2001 and recognises substantial equivalence in the accreditation of qualifications in engineering technology, normally of three years duration

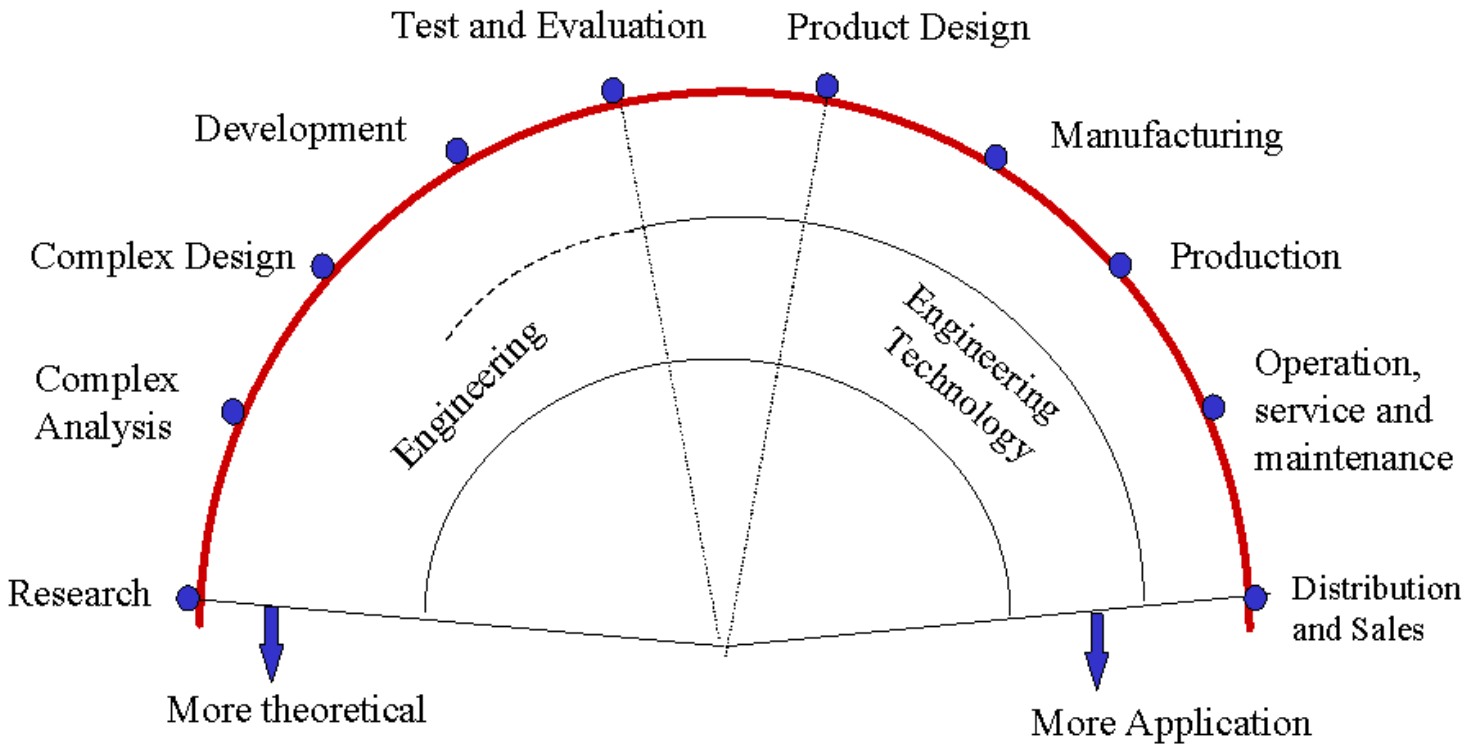
- *The **Dublin Accord*** commenced in 2002 is an agreement for substantial equivalence in the accreditation of tertiary qualifications in technician engineering, normally of two years duration. It commenced in 2002.

Roles of Engineering Personnel

Engineer Graduate	Engineering Technologist Graduate	Engineering Technician Graduate
Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization respectively to the solution of complex engineering problems	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to defined and applied engineering procedures, processes, systems or methodologies	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to wide practical procedures and practices

Engineering and Engineering Technology

Spectrum of Technical Job Functions



bing.com/images – engineering spectrum

Types of Engineering Problems

- Complex
- Broadly Defined
- Widely Defined

Complex Engineering Problems

	Complex Engineering Problems have characteristic WP1 and some or all of WP2 to WP7*:*
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, originality in analysis to formulate suitable models
Familiarity of issues	**WP4:** Involve **infrequently** encountered issues
Extent of applicable codes	**WP5:** Are **outside problems** encompassed by standards and codes of practice for professional engineering

Complex Engineering Problems

	Complex Engineering Problems have characteristic WP1 and some or all of WP2 to WP7*:*
Extent of stakeholder involvement and conflicting requirements	WP6: Involve **diverse groups of stakeholders with widely varying needs**
Interdependence	**WP 7:** Are **high level problems** including **many component parts or sub-problems**
Consequences	**EP1:** Have **significant consequences** in a range of contexts
Judgement	**EP2:** Require **judgement in decision making**

Broadly-defined Engineering Problem

	***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

Broadly-defined Engineering Problem

	***Broadly-defined Engineering Problems* have characteristic SP1 and some or all of SP2 to SP7:**
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**
Judgement	**TP2:** Require **judgement in decision making**

Well-defined Engineering Problem

	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 **standardized ways**
Familiarity of issues	**DP4:** Are **frequently encountered** and thus **familiar to most practitioners** in the practice area

Well-defined Engineering Problem

	Well-defined Engineering Problems have characteristic DP1 and some or all of DP2 to DP7*:*
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**

Engineering Activities

	Attributes	Complex Activities
1	**Preamble**	**Complex activities** means (*engineering)* activities or projects that have some or all of the following characteristics:
2	Range of resources	**EA1:** Involve the use of **diverse resources** (and for this purpose resources includes people, money, equipment, materials, information and technologies)
3	Level of interactions	**EA2:** Require **resolution of significant problems** arising from interactions between **wide-ranging or conflicting technical, engineering or other issues**
4	Innovation	**EA3:** Involve **creative use of engineering principles and research-based knowledge** in novel ways
5	Consequences to society and the environment	**EA4:** Have significant consequences in a range of contexts, characterized by **difficulty of prediction and mitigation**
6	Familiarity	**EA5:** Can **extend beyond previous experiences** by applying **principles-based approaches**

Engineering Activities

	Attributes	Broadly-defined Activities
1	**Preamble**	Broadly defined activities means (*engineering)* activities or projects that have some or all of the following characteristics:
2	**Range of resources**	**TA1:** Involve a **variety of resources** (and for this purposes resources includes people, money, equipment, materials, information and technologies)
3	**Level of interactions**	**TA2:** Require resolution of **occasional interactions** between technical, engineering and other issues, of which **few are conflicting**
4	**Innovation**	**TA3:** Involve the **use of new materials, techniques or processes in non-standard ways**
5	**Consequences to society and the environment**	**TA4:** Have **reasonably predictable cons**equences that are **most important locally**, but may extend more widely
6	**Familiarity**	**TA5:** Require a knowledge of **normal operating procedures and processes**

Engineering Activities

	Attributes	Well-defined Activities
1	**Preamble**	Well-defined activities means (*engineering)* activities or projects that have some or all of the following characteristics:
2	**Range of resources**	**NA1:** Involve a **limited range of resources** (and for this purpose resources includes people, money, equipment, materials, information and technologies)
3	**Level of interactions**	**NA2:** Require resolution of interactions between **limited technical and engineering issues with little or no impact of wider issues**
4	**Innovation**	**NA3:** Involve **the use of existing materials, techniques, or processes in modified or new ways**
5	**Consequences to society and the environment**	**NA4:** Have consequences that are **locally important and not far-reaching**
6	**Familiarity**	**NA5:** Require a knowledge of practical procedures and practices for **widely-applied operations and processes**

Knowledge Profiles for Engineer Education

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: 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; the **impacts of engineering activity: economic, social, cultural, environmental and sustainability**
WK8: Engagement with selected knowledge in the **research literature** of the discipline

Knowledge Profiles for Engineering Technologist Education

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: Engagement with the technological literature of the discipline

Knowledge Profiles for Engineering Technician Education

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

Graduate Attributes

- A set of individually assessable outcomes that indicate the graduate's potential to acquire competence to practise at the appropriate level (Engineer, Engineering Technologist and Engineering Technician)
- Each degree programme should thus set its own programme outcomes which are unique and measurable and in line with this general Graduate Attributes

Engineering Knowledge

Differentiation Characteristic	WA	SA	DA
Breadth and depth of education and type of knowledge, both theoretical and practical	**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

Differentiation Characteristic	WA	SA	DA
Complexity of analysis	**WA2:** Identify, formulate, research literature and analyse ***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 analyse ***broadly-defined*** **engineering problems** reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialisation (SK1 to SK4)	**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)

Design/Development of Solutions

Differentiation Characteristic	WA	SA	DA
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

Differentiation Characteristic	WA	SA	DA
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**

Tool Usage

Differentiating Characteristic : Level of Understanding of the Appropriateness of the Tool

Engineer-Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician-Dublin Accord
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 Team and the Society

Differentiation Characteristic	WA	SA	DA
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 Solution

Engineer-Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician-Dublin Accord
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

Differentiating Characteristic: Understanding and Level of Practice

Engineer-Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician-Dublin Accord
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 ethic**s and responsibilities and norms of technician practice (DK7)

Individual and Collaborative Team work

Differentiation Characteristic	WA	SA	DA
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

Differentiation Characteristic	WA	SA	DA
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**	**SA9:** 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**	**DA9:** 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

Differentiation Characteristic	WA	SA	DA
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

Life Long Learning

Differentiation Characteristic	WA	SA	DA
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

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional 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 **standardized practices**

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
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

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
Problem analysis: Complexity of analysis	**EC3:** Define, investigate and analyse **complex problems**	**TC3:** Identify, clarify, and analyse **broadly-defined problems**	**NC3:** Identify, state and analyse **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**

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
Evaluation: Type of activity	**EC5:** Evaluate the outcomes and impacts of **complex activities**	**TC5:** Evaluate the outcomes and impacts of **broadly defined activities**	**NC5:** Evaluate the outcomes and impacts of **well-defined activities**

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
Protection of society: Types of activity and responsibility to the public	**EC6:** Recognise the reasonably **foreseeable social, cultural and environmental effects** of complex activities generally, and have regard to the need for **sustainability**; recognise that the **protection of society is the highest priority**	**TC6:** Recognise 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 risks**	**NC6:** Recognise the reasonably foreseeable social, cultural and environmental effects of **well-defined activit**ies generally, and have regard to the need for sustainability; use **engineering technical expertise to prevent dangers to the public**

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
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 activities **ethically**	**TC8:** Conduct activities **ethically**	**NC8:** Conduct activities **ethically**

Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
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: Requirement for inclusive communications. 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

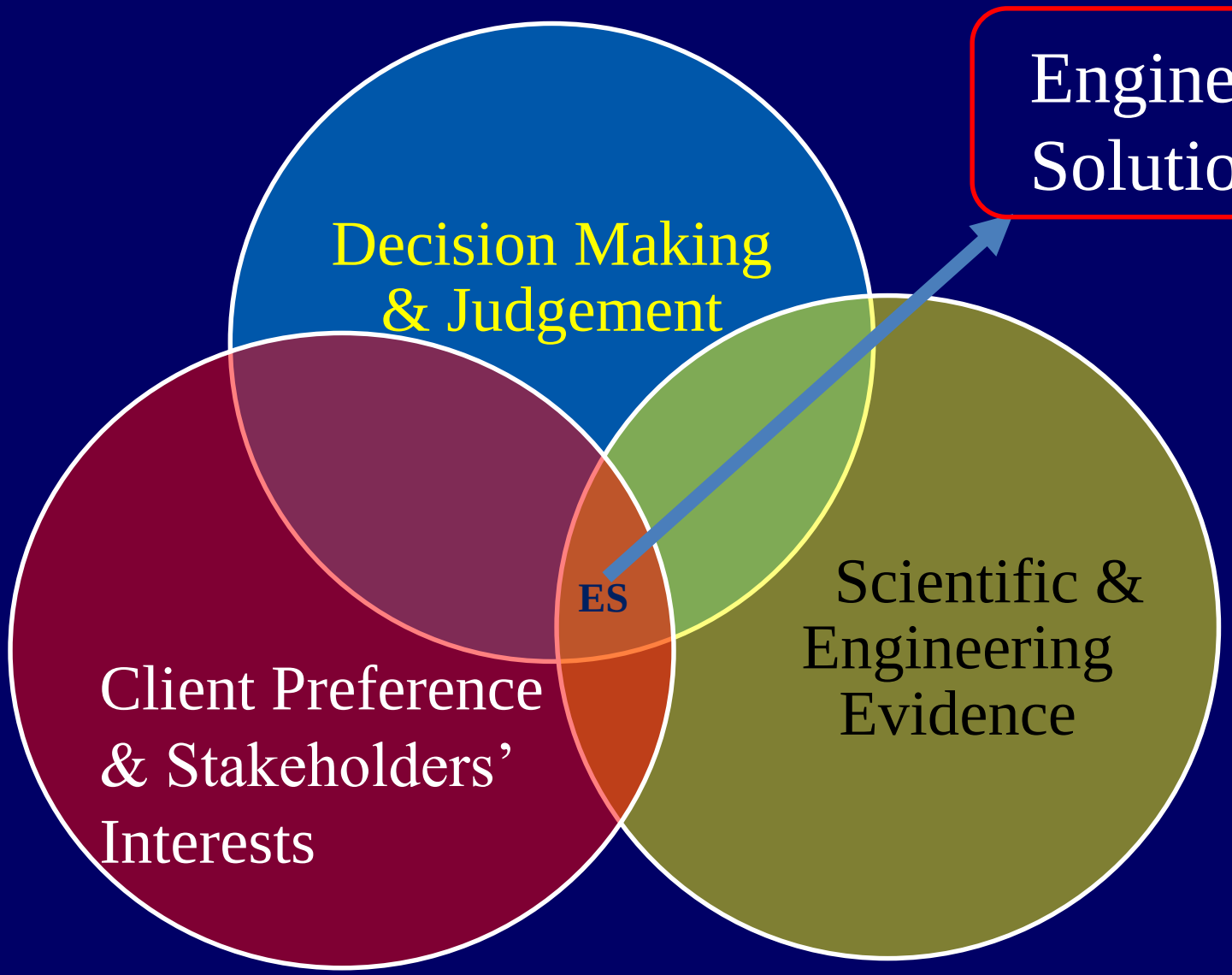
Engineering Competency Profile

Differentiation Characteristics	Professional Engineer	Professional Engineering Technologist	Professional Engineering Technician
Continuing Professional Development (CPD) and Lifelong learning: Preparation for and depth of continuing learning. No differentiation in this characteristic	**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

Engineering Competency Profile

Judgement: Level of developed knowledge, and ability and judgement in relation to type of activity	**EC12:** Recognize **complexity and assess alternatives** in light of competing requirements and incomplete knowledge. Exercise sound judgement in the course of all **complex activities**	**TC12: Choose appropriate technologies** to deal with broadly defined problems. Exercise sound judgement in the course of all **broadly-defined activities**	**NC12: Choose and apply appropriate technical expertise**. Exercise sound judgement in the course of all **well-defined activities**
Responsibility for decisions: Type of activity for which responsibility is taken	**EC13:** Be responsible for making decisions on part or all of **complex activities**	**TC13:** Be responsible for making decisions on part or all of **broadly defined activities**	**NC13:** Be responsible for making decisions on part or all of **well-defined activities**

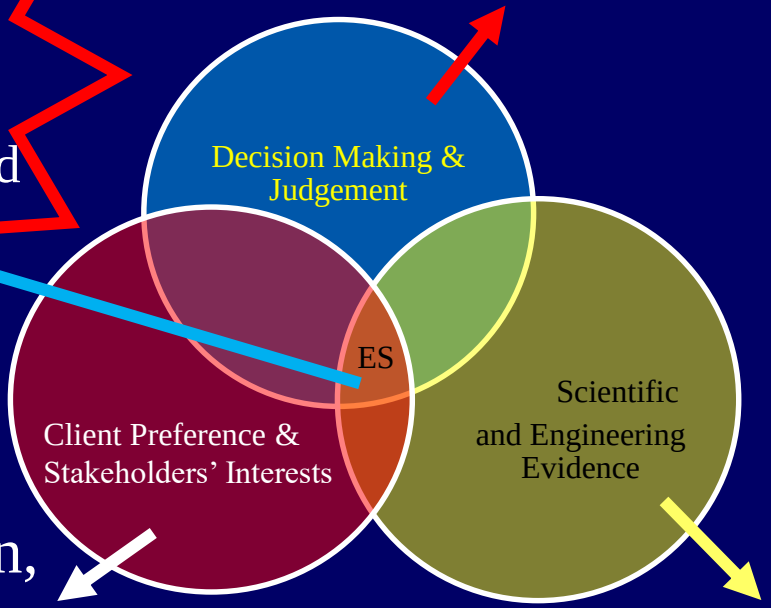
Engineering Solution



Engineering Solution

Comparison of Solutions, Cost Effectiveness, Using Relevant Tools, Selection of Best Solution,
Judgement, Decision Making

Engineering Solution based on Sound Judgement – Education Outcomes Demonstrated



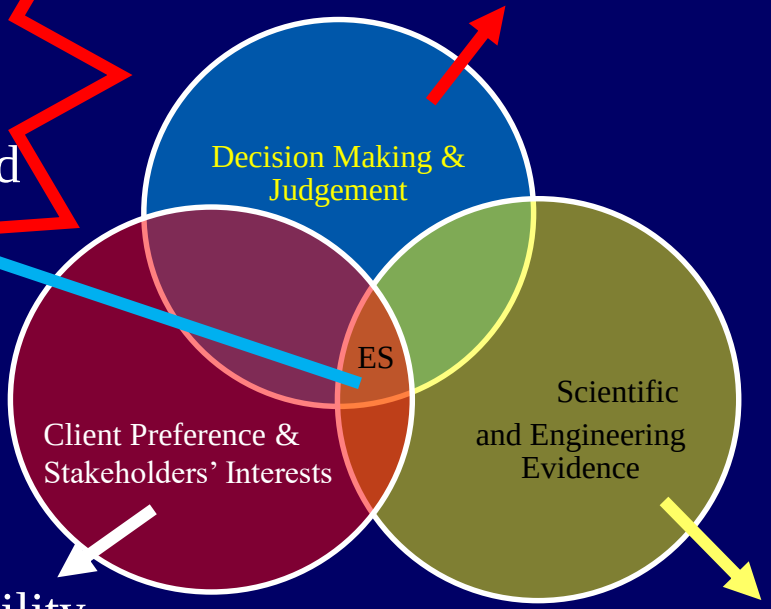
Collecting Information, Negotiation, Values, Resolving Conflicting Issues & Interests, Convincing Stakeholders

Research, Experiences of Others, Relevant Engineering Principles and Scientific Theories and Methods

Engineering Solution

Design & development of Solution, Modern Tool Usage, Individual & Teamwork, Project Management & Finance

Engineering Solution based on Sound Judgement – Education Outcomes Demonstrated



Engineer & Society, Environment & Sustainability, Ethics, Individual & Teamwork. Communication, Project Management & Finance

Engineering Knowledge, Problem Analysis, Investigation, Lifelong Learning

Acknowledgements

For graduate attributes, knowledge profiles and professional competency profiles, the main reference is **"Graduate Attributes and Professional Competencies" published by the International Engineering Alliance which are also adopted by FEIAP**

(https://www.ieagreements.org)

Final Take-Away

- Your Values determine your Code of Conduct
- Your Global Perspective determines your Ideological Level
- Your Life Outlook determines your Life Pursuit


thank you
danke
рахмат
謝謝
ngiyabonga
teşekkür ederim
Баярлалаа
спасибо
mersi
barka
welalin
tack
spas
faafetai lava
vinaka
kia ora
dank je
misaotra
matondo
paldies
grazzi
mahalo
tapadh leat
gracias
kiitos
dankie
спасібі
blagodaram
хвала
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nandri
dhanyavad
obrigada
tenki
bedankt
bayarlalaa
gràcie
hvala
maururu
köszönöm
akun dankon
enkosi
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sulpáy
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sukriya
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taiku
arigatô
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dakujem
trugarez
obrigado
mèsi
sagolun
ありがとう
tanemirt
grazie
najis tuke
didi madloba
terima kasih
rahmet
dhanyavadagalu
shukriya
merce
мерси
kam sah hamnida
rahmat
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merci
xièxie
감사합니다