

**INTERNATIONAL AGREEMENTS
ON
MUTUAL RECOGNITION
OF
TERTIARY-LEVEL QUALIFICATIONS
IN
ENGINEERING**

REYNALDO B. VEA, PhD
President, Mapua Institute of Technology

CEAP National Convention
Cebu City, September 23, 2010

EDUCATION

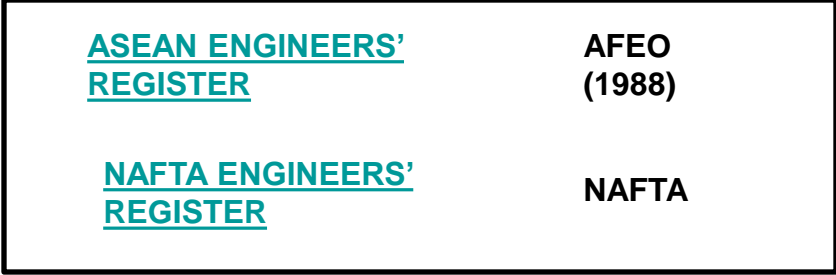
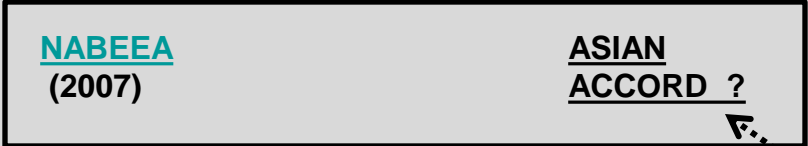
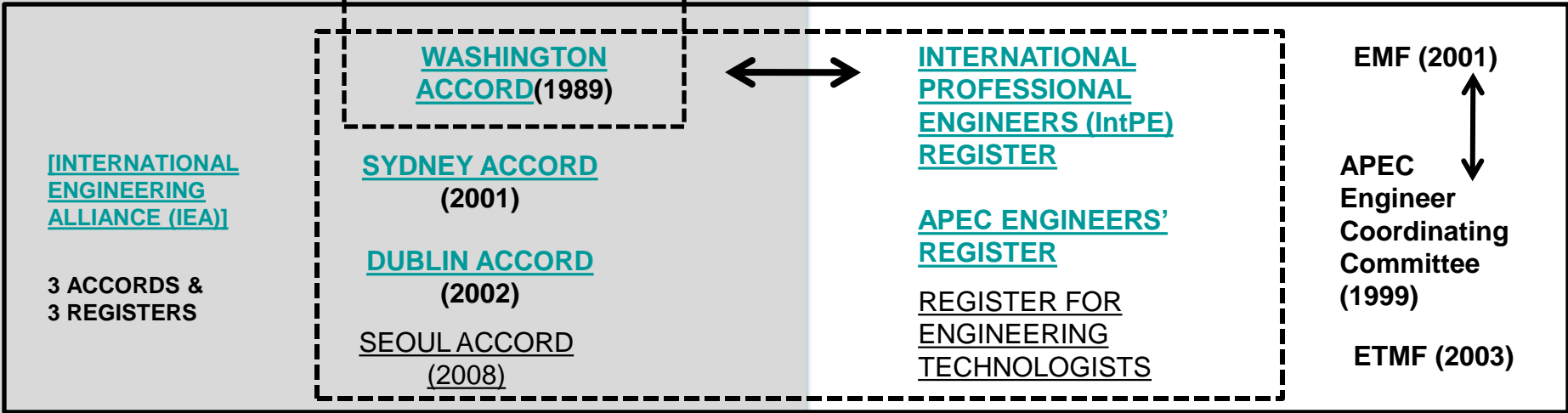
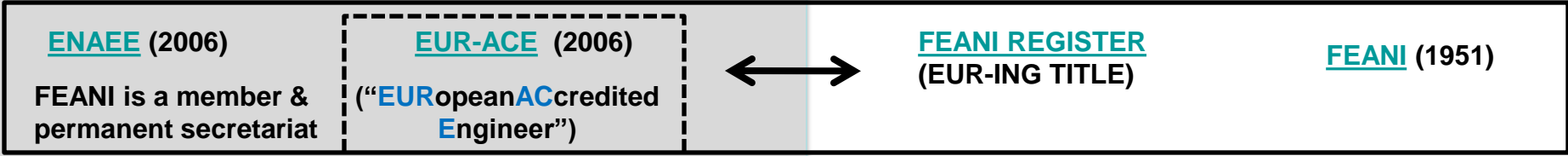
PRACTICE

GO ON

ACCREDITATION NETWORKS

ACCREDITATION AGREEMENTS

INTERNATIONAL REGISTRIES OF ENGINEERS



NETWORKS/ASSN'S OF SCHOOLS

SEFI (1973)
member of ENAAE
Assoc member of FEANI (Jan 2009)

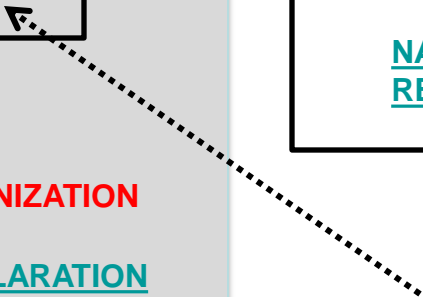
AESEAP (1972)

A NON-ORGANIZATION

BOLOGNA DECLARATION (1999)

OTHER ORGANIZATION

FEIAP (FORMERLY FEISEAP)



The Bologna Declaration (1999)

a pledge by 29 countries to reform the structures of their higher education systems in a convergent way

Notable objectives:

to enhance the employability and mobility of citizens and to increase the international competitiveness of European higher education;

to adopt a common framework of comparable degrees

to introduce undergraduate and postgraduate levels in all countries, with the first degrees no shorter than 3 years and relevant to the labor market; 2-year Master's degree

to adopt a compatible credit systems also covering lifelong learning activities

to define a European dimension in quality assurance, with comparable criteria and methods

Signed by: Austria, Belgium (French community), Belgium (Flemish community), Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Swiss Confederation, United Kingdom.

**Association for Engineering Education in
Southeast Asia and the Pacific
(AEESEAP)**

Founded in 1972 with UNESCO support; first conference held in Manila

Sister organization of the Federation of Engineering Institutions in Southeast Asia and the Pacific (FEISEAP)

Involved in the initial discussions that led to the creation of the APEC engineers register



European Society for Engineering Education
Europäische Gesellschaft für Ingenieur-Ausbildung
Société Européenne pour la Formation des Ingénieurs

Founded in 1973 as a non-profit organization under Belgian Law

Largest network of higher engineering institutions and of individuals involved in engineering education in Europe.

SEFI is the first example of an association directly linking the institutions of higher engineering education, hence independent of national and/or community filters in establishing its policy, as an international forum for discussing problems and identifying solutions relating to engineering education.

SEFI participates in the **SOCRATES** and **TEMPUS** Programs, which both support the **EUR-ACE** Project, which aims to set up a European system for the accreditation of engineering education

The **SOCRATES program** was an educational initiative of the European Commission 31 countries took part (the then 25 European Union countries and the then candidate countries Romania and Bulgaria, Iceland, Liechtenstein, Norway and Turkey. The initial Socrates program ran from 1994 until 31 December 1999 when it was replaced by the Socrates II program on 24 January 2000, which ran until 2006. This, in turn, was replaced by the Lifelong Learning Program 2007-2013.

The **Tempus Program (The Trans-European mobility scheme for university studies)** supports the modernization of higher education and creates an area of co-operation in countries surrounding the EU. Established in 1990 after the fall of the Berlin Wall, the scheme now covers 27 countries in the Western Balkans, Eastern Europe and Central Asia, North Africa and the Middle East. Tempus is managed by the European Commission's education and culture, enlargement and aid departments. It is financed through three of the European Commission's external assistance instruments: the Instrument for Pre-accession Assistance (Western Balkans); the European Neighborhood and Partnership Instrument (Eastern Europe, North Africa and the Middle East); and the Development and Cooperation Instrument (Central Asia).

European Network for Accreditation of Engineering Education (ENAAEE)

Stemmed out of ESOEPE, the “*European Standing Observatory for the Engineering Profession and Education*”, which was established on 9 September 2000 with the purpose of:

- building confidence in systems of accreditation of engineering degree programs within Europe;**
- facilitating "exchange of information;**
- facilitating voluntary agreements on accreditation of engineering educational programs and recognition of engineering qualifications;**
- and facilitating the development of standards on the competence requirements of graduate engineers.**

European Network for Accreditation of Engineering Education (ENAAEE)

To pursue these aims, ESOEPE took the initiative of proposing to the European Commission (DG Education and Culture) the **EUR-ACE** (“EUROpean Accredited Engineer”) project, approved in August 2004. Between September 2004 and March 2006 EUR-ACE elaborated a proposal for an European system of accreditation of engineering programs at the First and Second Cycle level (including programs leading directly to a Second Cycle degree).

In the envisaged system, “national” engineering accreditations agencies should continue to award their certificates, and the common EUR-ACE quality label be added to them.

In order to contribute more effectively to the development of quality assurance and accreditation policies in European engineering education, ESOEPE had decided to transform itself into a formal International Non-profit Association, denoted ENAAEE (European Network for Accreditation of Engineering Education), as ratified by two ESOEPE General Assemblies (October 2005; March 2006).

European Network for Accreditation of Engineering Education (ENAAE)

ENAAE was formally established on 8 February 2006 by 14 associations concerned with engineering education throughout Europe.

- FEANI** Aisbl, 18 Avenue Roger Vandendriessche, B-1150 Bruxelles, Belgium;
- **ENGINEERING COUNCIL UK**, 10 Maltravers Street, London WC2R 3ER, United Kingdom;
- **CTI – COMMISSION DES TITRES D'INGENIEUR**, 135 Avenue de Ranguel, 31077 Toulouse Cedex 4, France;
- **ASIIN – FACHAKKREDITIERUNGSAGENTUR FÜR STUDIENGÄNGE DER INGENIEURWISSENSCHAFTEN, DER INFORMATIK, DER NATURWISSENSCHAFTEN UND DER MATHEMATIK e.V**, PO Box 101139, D-40002 Düsseldorf, Germany;
- **ORDEM DOS ENGENHEIROS**, 13 Av. Sidonio Pais, 1050-212 Lisbon, Portugal;
- **CoPI – CONFERENZA DEI PRESIDI DELLE FACOLTA' DI INGEGNERIA ITALIANE**, c/o Universita La Sapienza – Facolta' di Ingegneria, Via Eudossiana 18, I-00184 Roma, Italy;
- **UAICR – UNIUNEA ASOCIATILOR INGINERILOR CONSTRUCTORI DIN ROMANIA**, Bul.Lacul.Tei 124, 020396 Bucharest, Romania;
- **SEFI – SOCIETE EUROPEENNE POUR LA FORMATION D'INGENIEURS**, 119 rue de Stassart, B-1050 Bruxelles, Belgium;
- **IEI – THE INSTITUTION OF ENGINEERS OF IRELAND**, 22 Clyde Road, Ballsbridge, Dublin 4, Ireland,
- **RAEE – RUSSIAN ASSOCIATION FOR ENGINEERING EDUCATION**, Office 237a, 30 Lenin avenue, TPU, Tomsk 634050, Russia;
- **EUROCADRES – CONSEIL DES CADRES EUROPEENS**, 5 boulevard du Roi Albert II, B-1210 Bruxelles, Belgium;
- **UNIFI – UNIVERSITA DEGLI STUDI DI FIRENZE**, Via di Santa Marta 3, I-50139 Firenze, Italy;
- **IDA – THE DANISH SOCIETY OF ENGINEERS**, 31-33 Kalvebod Brygge, 1780 Copenhagen V, Denmark;
- **FOTEP - FEDERAL OFFICE FOR PROFESSIONAL EDUCATION AND TECHNOLOGY**, 27 Effingerstrasse, 3003 Bern, Switzerland.

European Network for Accreditation of Engineering Education (ENAAEE)

The Permanent Secretariat of ENAAEE has been entrusted to [FEANI](#).

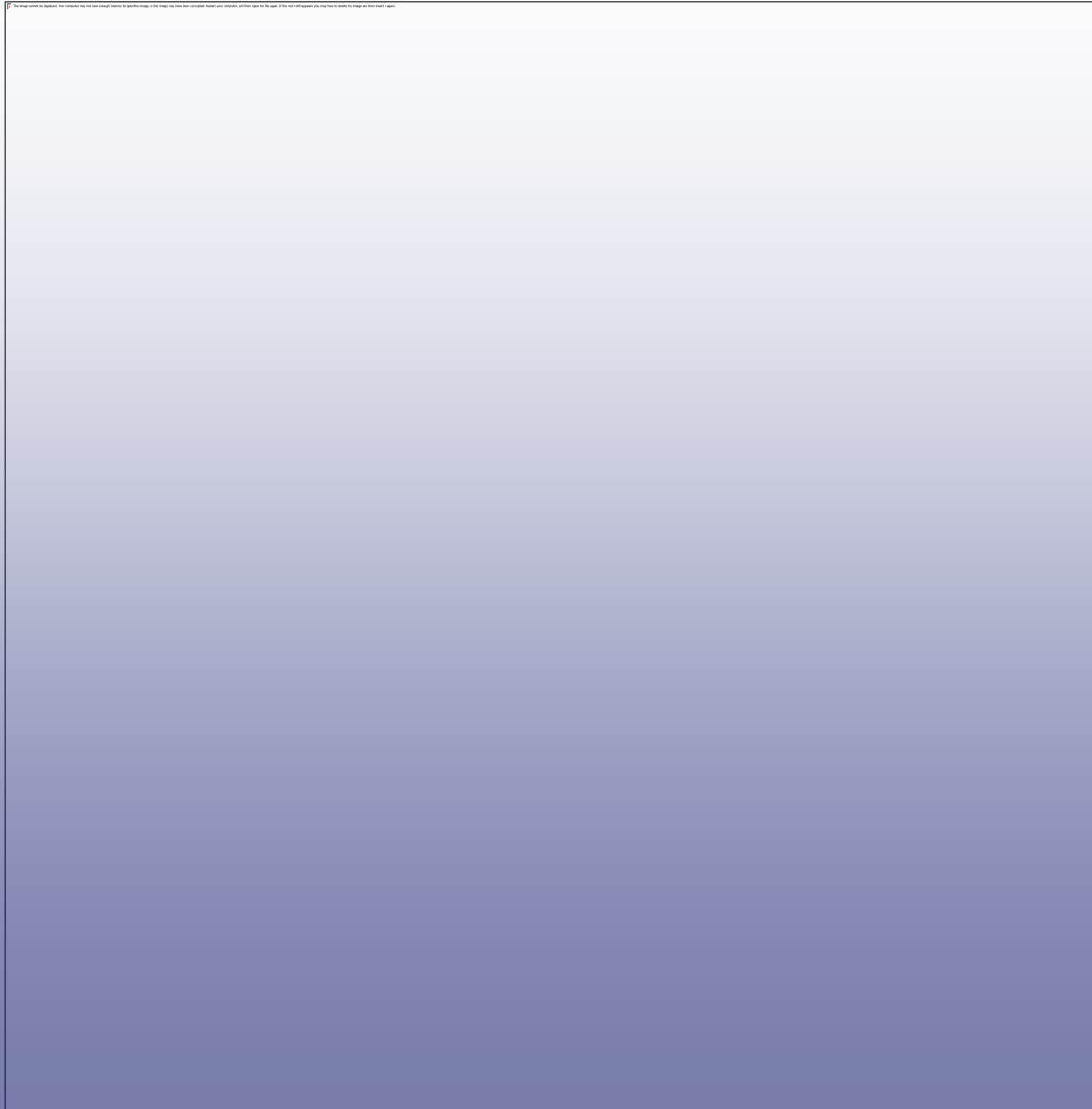
ENAAEE is committed to implementing the EUR-ACE proposals and creating the EUR-ACE system of accredited engineering educational programs.

Towards this goal ENAAEE promoted and sponsored the presentation of three new grant applications to the EC, namely:

under the “**Socrates**” Program, a project (EUR-ACE Implementation), that aims at making the EUR-ACE proposals operational by initiating the award of EUR-ACE labels; promoting accreditation processes throughout Europe; arranging training for international accreditors; setting up the essential administrative structure.
setting up the essential administrative structure.

under the “**Tempus-Tacis**” Program, a project (PRO-EAST: Promotion and Implementation of EUR-ACE Standards), aimed at disseminating and applying the EUR-ACE standards in the Russian Federation. [This project has just been approved for funding by the European Commission.]

under the “**Tempus-Meda**” Programme, a project (LEPAC: Creation of a Lebanese Engineering Programs Accreditation Commission) aimed at using the EUR-ACE approach for establishing a national system of accreditation of engineering programmes in Lebanon.



© 2000 Microsoft Corporation. All rights reserved. Microsoft, the Microsoft Dynamics logo, and the Dynamics logo are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Network of Accreditation Bodies for Engineering Education in Asia (NABEEA)

is a multi-lateral arrangement among groups of jurisdictional agencies in Asia responsible for accreditation of qualifications in their national jurisdiction boundaries who have chosen to engage in mutual capacity building to achieve harmonization of the accreditation systems at a fundamental level. Membership is voluntary but the members are committed to the development and recognition of good practice in engineering education for the region.

Levels of cooperation;

Level I: glossary of terminologies; report on issues in engineering education accreditation in Asian jurisdictions

Level II: identification of similarities and dissimilarities

Level III: harmonization of accreditation systems at a basic level

Level IV: recognition of substantial equivalence of accreditation systems

Network of Accreditation Bodies for Engineering Education in Asia (NABEEA)

Full members:

Accreditation Board for Engineering Education of Korea (ABEEK)

Board of Accreditation for Engineering & Technical Education, Bangladesh (BAETE)

Council of Engineers, Thailand (COE)

Engineering Accreditation Council, Malaysia (EAC)

Institute of Engineering Education Taiwan (IEET)

The Institution of Engineers, Singapore

Japan Accreditation Board for Engineering Accreditation (JABEE)

Philippine Technological Council (PTC)

Associate members:

Chinese Taipei APEC Engineer Monitoring Committee (CTAEMC)

The Institution of Engineers, Malaysia (IEM)

The Institution of Professional Engineers, Japan (IPEJ)

The Korean Professional Engineers Association (KPEA)

The Philippine Association for Technological Education (PATE)

Note: The Federation of Engineering Institutions in Asia and the Pacific (FEIAP,) also has a working group working on the idea of an “Asian Accord”



The project EUR-ACE, Accreditation of European Engineering Programmes and Graduates, is supported by the European Commission through the Socrates and Tempus programmes.

The EUR-ACE project aims at setting up an European system for accreditation of Engineering education, with the following main aims: provide an appropriate “European label” to the graduates of the accredited educational programmes, improve the quality of educational programmes in engineering, facilitate trans-national recognition by the label marking, facilitate recognition by the competent authorities, in accord with the EU Directives and facilitate mutual recognition agreements. The system will be based on a set of common European standards that will be proposed, tested in a number of countries, refined and tuned, and then tested again in order to achieve the largest consensus. Also, a detailed proposal will be formulated on how to set up and run the system that must become self-supporting within the five years. The project will thus interest several target groups, from higher education decision-makers at the European level to governing bodies of HE Institutions (Higher Education Institutions), from national and local HE authorities to engineering teachers, from *professional organisations* to employers of engineers. It will be a significant contribution to the harmonization of the European higher education, and possibly pave the way for analogous initiatives in other professional fields.

The Participating Institutions are: FEANI, SEFI, CESAER, EUROCADRES, ENQHEEI, ASIIN, CTI, IEI, CoPI, UNIFI, OE, UAICR, RAEE, EC^{uk}.

The **EUR-ACE**® Label, property of ENAEE, was established in March 2006 following the successful completion of the EUR-ACE program funded by the European Commission. It is a decentralized European accreditation system of engineering study programs. In this system National Agencies accredit study programs, as they already do, and the EUR-ACE label can be added to the accreditation, provided the Agency and the program satisfy the EUR-ACE Framework Standards. The label distinguishes between "First Cycle Degree" and "Second Cycle Degree", in accord with the European Qualification Framework.

At present, the Agencies authorized to award the EUR-ACE label are:

ASIIN - Fachakkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V. (DE)

CTI - Commission des Titres d'Ingénieur (FR)

ECUK - Engineering Council UK (UK)

Engineers Ireland (IE)

Ordem dos Engenheiros (PT)

RAEE - Russian Association for Engineering Education (RU)

There are now programs which have been awarded the EUR-ACE label. Apparent anomalies in the list reflect actual differences in practice between the respective countries and associated agency, and also the fact that Europe as a whole is presently in a transition period where some nations are restructuring their degree programs to conform more rationally to the two-cycle structure. In particular, some programs with a Bachelor designation are labelled First-Cycle and some Second-Cycle: this does not imply a difference of assessment by different agencies, but merely the different historical designation of degrees by the nation concerned. It can be expected that these anomalies will be removed as restructuring is implemented in the framework of the “**Bologna Process**”, although this will be a lengthy process since it requires changes in program structure, agreement within each HEI and subsequent throughput of students, and often revision of national rules and legislation.

EUR ACE FRAMEWORK STANDARDS

The six Programme Outcomes of accredited engineering degree programmes are:

- **Knowledge and Understanding;**
- **Engineering Analysis;**
- **Engineering Design;**
- **Investigations;**
- **Engineering Practice;**
- **Transferable Skills.**

Knowledge and Understanding

The underpinning knowledge and understanding of science, mathematics and engineering fundamentals are essential to satisfying the other programme outcomes. Graduates should demonstrate their knowledge and understanding of their engineering specialisation, and also of the wider context of engineering.

First Cycle graduates should have:

- knowledge and understanding of the scientific and mathematical principles underlying their branch of engineering;**
- a systematic understanding of the key aspects and concepts of their branch of engineering;**
- coherent knowledge of their branch of engineering including some at the forefront of the branch;**
- awareness of the wider multidisciplinary context of engineering.**

Second Cycle graduates should have:

- an in-depth knowledge and understanding of the principles of their branch of engineering;**
- a critical awareness of the forefront of their branch.**

Engineering Analysis

Graduates should be able to solve engineering problems consistent with their level of knowledge and understanding, and which may involve considerations from outside their field of specialisation. Analysis can include the identification of the problem, clarification of the specification, consideration of possible methods of solution, selection of the most appropriate method, and correct implementation. Graduates should be able to use a variety of methods, including mathematical analysis, computational modelling, or practical experiments, and should be able to recognise the importance of societal, health and safety, environmental and commercial constraints.

First Cycle graduates should have:

- the ability to apply their knowledge and understanding to identify, formulate and solve engineering problems using established methods;
- the ability to apply their knowledge and understanding to analyse engineering products, processes and methods;
- the ability to select and apply relevant analytic and modelling methods.

Second Cycle graduates should have:

- the ability to solve problems that are unfamiliar, incompletely defined, and have competing specifications;
- the ability to formulate and solve problems in new and emerging areas of their specialisation;
- the ability to use their knowledge and understanding to conceptualise engineering models, systems and processes;
- the ability to apply innovative methods in problem solving.

Engineering Design

Graduates should be able to realise engineering designs consistent with their level of knowledge and understanding, working in cooperation with engineers and non-engineers. The designs may be of devices, processes, methods or artefacts, and the specifications could be wider than technical, including an awareness of societal, health and safety, environmental and commercial considerations.

First Cycle graduates should have

- the ability to apply their knowledge and understanding to develop and realise designs to meet defined and specified requirements;**
- an understanding of design methodologies, and an ability to use them.**

Second Cycle graduates should have:

- an ability to use their knowledge and understanding to design solutions to unfamiliar problems, possibly involving other disciplines;**
- an ability to use creativity to develop new and original ideas and methods;**
- an ability to use their engineering judgement to work with complexity, technical uncertainty and incomplete information.**

Investigations

Graduates should be able to use appropriate methods to pursue research or other detailed investigations of technical issues consistent with their level of knowledge and understanding. Investigations may involve literature searches, the design and execution of experiments, the interpretation of data, and computer simulation. They may require that data bases, codes of practice and safety regulations are consulted.

First Cycle graduates should have:

- the ability to conduct searches of literature, and to use data bases and other sources of information;**
- the ability to design and conduct appropriate experiments, interpret the data and draw conclusions;**
- workshop and laboratory skills.**

Second Cycle graduates should have:

- the ability to identify, locate and obtain required data;**
- the ability to design and conduct analytic, modelling and experimental investigations;**
- the ability to critically evaluate data and draw conclusions;**
- the ability to investigate the application of new and emerging technologies in their branch of engineering.**

Engineering Practice

Graduates should be able to apply their knowledge and understanding to developing practical skills for solving problems, conducting investigations, and designing engineering devices and processes. These skills may include the knowledge, use and limitations of materials, computer modelling, engineering processes, equipment, workshop practice, and technical literature and information sources. They should also recognise the wider, non-technical implications of engineering practice, ethical, environmental, commercial and industrial.

First Cycle graduates should have:

- the ability to select and use appropriate equipment, tools and methods;**
- the ability to combine theory and practice to solve engineering problems;**
- an understanding of applicable techniques and methods, and of their limitations;**
- an awareness of the non-technical implications of engineering practice.**

Second Cycle graduates should have:

- the ability to integrate knowledge from different branches, and handle complexity;**
- a comprehensive understanding of applicable techniques and methods, and of their limitations;**
- a knowledge of the non-technical implications of engineering practice.**

Transferable Skills

The skills necessary for the practice of engineering, and which are applicable more widely, should be developed within the programme.

First Cycle graduates should be able to:

- function effectively as an individual and as a member of a team;**
- use diverse methods to communicate effectively with the engineering community and with society at large;**
- demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice;**
- demonstrate an awareness of project management and business practices, such as risk and change management, and understand their limitations;**
- recognise the need for, and have the ability to engage in independent, life-long learning.**

Second Cycle graduates should be able to:

- fulfil all the Transferable Skill requirements of a First Cycle graduate at the more demanding level of Second Cycle;**
- function effectively as leader of a team that may be composed of different disciplines and levels;**
- work and communicate effectively in national and international contexts.**

ENGINEERING OCCUPATIONAL GROUPS

There are three engineering occupational groups within the wider engineering profession: professional engineers, engineering technologists, and engineering technicians.

Before specifying or employing engineering expertise, it is important to gauge the level of engineering expertise needed.

For complex engineering use a professional engineer.

For broadly-defined engineering use an engineering technologist.

For well-defined engineering use an engineering technician.

THE WASHINGTON ACCORD

The Washington Accord was signed in 1989. It is an agreement between the bodies responsible for accrediting professional engineering degree programs in each of the signatory countries. It recognizes the substantial equivalency of programs accredited by those bodies, and recommends that graduates of accredited programs in any of the signatory countries be recognized by the other countries as having met the academic requirements for entry to the practice of engineering. The Washington Accord covers professional engineering undergraduate degrees.

The licensing or registration of professional engineers is not covered directly or in full by the Washington Accord. However, the academic requirements which are part of licensing /regulation requirements are covered by the Accord.

THE WASHINGTON ACCORD

Signatories have full rights of participation in the Accord; qualifications accredited or recognized by other signatories are recognized by each signatory as being substantially equivalent to accredited or recognized qualifications within its own jurisdiction.

Australia - Represented by [Engineers Australia \(1989\)](#)

Canada - Represented by [Engineers Canada \(1989\)](#)

Chinese Taipei - Represented by [Institute of Engineering Education Taiwan \(2007\)](#)

Hong Kong China - Represented by [The Hong Kong Institution of Engineers \(1995\)](#)

Ireland - Represented by [Engineers Ireland \(1989\)](#)

Japan - Represented by [Japan Accreditation Board for Engineering Education \(2005\)](#)

Korea - Represented by [Accreditation Board for Engineering Education of Korea \(2007\)](#)

Malaysia - Represented by [Board of Engineers Malaysia](#)

New Zealand - Represented by [Institution of Professional Engineers NZ \(1989\)](#)

Singapore - Represented by [Institution of Engineers Singapore \(2006\)](#)

South Africa - Represented by [Engineering Council of South Africa \(1999\)](#)

United Kingdom - Represented by [Engineering Council UK \(1989\)](#)

United States - Represented by [Accreditation Board for Engineering and Technology \(1989\)](#)

Organizations holding provisional status have been identified as having qualification accreditation or recognition procedures that are potentially suitable for the purposes of the Accord; those organizations are further developing those procedures with the goal of achieving signatory status in due course; qualifications accredited or recognized by organizations holding provisional status are not recognized by the signatories

Germany - Represented by [German Accreditation Agency for Study Programs in Engineering and Informatics](#)

India - Represented by [National Board of Accreditation of All India Council for Technical Education](#)

Russia - Represented by [Russian Association for Engineering Education](#)

Sri Lanka - Represented by [Institution of Engineers Sri Lanka](#)

Note: UK, Ireland, Germany & Russia are also members of FEANI

THE SYDNEY ACCORD

Flowing from the Washington Accord, a similar Agreement was developed for Engineering Technologists or Incorporated Engineers, called the Sydney Accord (SA), which was signed in June 2001.

THE DUBLIN ACCORD

The Dublin Accord is an agreement for the international recognition of Engineering Technician qualifications. In May 2002 the national engineering organizations of the United Kingdom, Republic of Ireland, South Africa and Canada signed an agreement mutually recognizing the qualifications which underpin the granting of Engineering Technician titles in the four countries. Since then, two further economies have attained provisional membership, and are working towards signatory status. They are New Zealand and the United States.



**Fédération Européenne d'Associations Nationales d'Ingénieurs
European Federation of National Engineering Associations**

FEANI is a federation of professional engineers that unites 350 national engineering associations from 31 European countries. Thus, FEANI represents the interests of over 3.5 million professional engineers in Europe. Through its activities and services, especially with the attribution of the EUR ING professional title, FEANI aims to facilitate the mutual recognition of engineering qualifications in Europe.

Country	Name of the National Member
Austria	Österreichisches Nationalkomitee der FEANI
Belgium	Comité National Belge de la FEANI (CNB/BNC)
Bulgaria	Federation of Scientific Technical Unions in Bulgaria (FNTS)
Switzerland	Schweizer Nationalkomitee für FEANI
Cyprus	FEANI Cyprus National Committee
Czech Republic	Czech Association of Scientific and Technical Societies (CSVTS)
Germany	Deutsches Nationalkomitee der FEANI
Denmark	Ingeniørforeningen i Danmark (IDA)
Estonia	Estonian Association of Engineers
Spain	Comite Nacional Espanol de la FEANI
Finland	The Finnish National Committee for FEANI
France	Conseil National des Ingénieurs et des Scientifiques de France (CNISF)
United Kingdom	British National FEANI Committee
Greece	Comité National Hellénique de la FEANI
Hungary	Hungarian National Committee for FEANI
Ireland	Engineers Ireland
Iceland	Association of Chartered Engineers of Iceland
Italy	Consiglio Nazionale Ingegneri (CNI)
Luxembourg	Association Luxembourgeoise des Ingénieurs Industriels (A.L.I.I.)
Malta	Chamber of Engineers
Netherlands	Netherlands National FEANI Committee
Norway	Norwegian National Committee for FEANI
Poland	Polish Federation of Engineering Associations
Portugal	Ordem dos Engenheiros
Romania	The General Association of Engineers in Romania (AGIR)
Russia	Russian Union of Scientific and Engineering Associations of Russia (RUSEA) – Provisional Member as of January 2007
Sweden	Swedish National Committee for FEANI
Serbia	The Union of Engineers and Technicians of Serbia (UETS)
Slovenia	Slovenian National Committee for FEANI
Slovakia	Slovak National Committee for FEANI (SNKF)

The EUR ING Title

The EUR ING title delivered by FEANI is designed as a guarantee of competence for professional engineers, in order to facilitate the movement of practicing engineers within and outside the geographical area represented by FEANI's member countries and to establish a framework of mutual recognition of qualifications in order to enable engineers who wish to practice outside their own country to carry with them a guarantee of competence to provide information about the various formation systems of individual engineers for the benefit of prospective employers to encourage the continuous improvement of the quality of engineers by setting, monitoring and reviewing standards.

The EUR INGs are listed in the FEANI Register, a database maintained by the Secretariat General in Brussels. Currently over **30,700** European Engineers are listed in the register (October 2007).

The EUR ING Title

BASIC PRINCIPLES UNDERLYING THE CRITERIA FOR THE EUR ING TITLE

The qualification of the engineer, which falls into two main categories of different but equally important competencies - more theory oriented and more application oriented - first requires an **approved engineering education**. But full professional competence is only reached after gaining valid professional experience.

After a **secondary education** at a high level validated by one or more official certificates, normally awarded at the age of about 18 years, a minimum total period of **seven years' formation** - education, training and experience - is required by FEANI for the EUR ING title. This formation consists of:

Minimum **three years** of **engineering education** successfully completed by an official degree, in a discipline/programme and given by a university or other recognized body at university level, recognized by FEANI. The recognized bodies are listed in the FEANI Index.

Minimum **two years** of valid **professional experience**.

In case the education and experience together is less than the minimum **seven years' formation** required, the balance to seven years should be covered by education, experience, or training monitored by the approved engineering institutions, or by preliminary engineering professional experience.

In addition to these **formation requirements**, EUR INGS are required to comply with a Code of Conduct respecting the provisions of the FEANI Position Paper on Code of Conduct: Ethics and Conduct of Professional Engineers.

The EUR ING Title

FEANI maintains an INDEX listing the institutions of engineering higher education in 28 European countries represented within FEANI, and their engineering programs, which are all recognized by FEANI as fulfilling the mandatory education requirements for the EUR ING title.

Since February 2007, the EMC (European Monitoring Committee) in principle accepts the programmes accredited by agencies authorized to grant the EUR-ACE label. Those are included in the INDEX with a special mark.

Being approved by all FEANI National Members, the FEANI INDEX is an authoritative source of information about national engineering education systems and educational institutions. The INDEX is used by major European industries in aeronautics, automobile, power, information technologies, ... For cross checking engineers applications.

NAFTA ENGINEERS' REGISTER

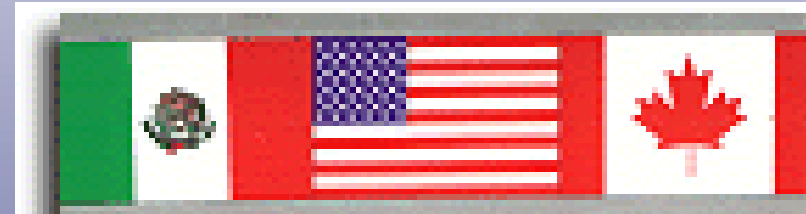
Under the NAFTA, the engineering professions in each of the three countries were required to meet, and to develop a mutual recognition agreement (MRA), outlining the requirements for an engineer in one country to practise in another.

The MRA was signed in June, 1995. Under this agreement, if you:

1. Hold an **accredited** Degree;
2. Have at least **12** years' Experience (8 after registration);
3. Can demonstrate knowledge of Local Codes and Practices;
4. Have effective language skills;
5. Agree to comply with local law;
6. Are willing to accept cross-border discipline; and
7. Comply with local continuing competency requirements

Or

1. Hold an **unaccredited** degree;
2. Have at least **16** years' experience (12 after registration);
3. Can demonstrate knowledge of local codes and practices;
4. Have effective language skills;
5. Agree to comply with local law;
6. Are willing to accept cross-border discipline; and
7. Comply with local continuing competency requirements



you will qualify for a one-year renewable temporary license to practise in any of the other jurisdictions that are signatories to the MRA.

ASEAN ENGINEERS REGISTER



The objectives of the Register are as follows:

- To promote recognition of ASEAN engineers within and outside ASEAN;
- To safeguard and promote the professional interests of engineers;
- To foster high standards of formation and professional practice and regularly review them;
- To promote cultural and professional links among members of the engineering profession within ASEAN;
- To enhance the wealth of ASEAN countries;
- To provide sufficient data regarding the formation of an individual engineer for the benefit of prospective employers;
- To encourage a continuous updating of the quality of engineers by setting, monitoring and reviewing standards.

In pursuit of these aims, AFEO shall maintain the Register into which individuals may be admitted provided they meet the specified minimum requirements.

ASEAN ENGINEERS REGISTER

The criteria stipulated below are the minimum requirements for an applicant to be admitted into the Register:

- Must possess an Engineering degree recognized by the home country;
- Must be a full-time member of the Engineering Organization or Technological Association in the home country and is licensed to practice engineering in the home country;
- Must have a minimum of seven (7) years of post-graduate professional working experience in an engineering environment, of which two years of experience involve the responsible charge of significant work;
- Must maintain his professional development at an acceptable level; and
- Must agree to be guided by the ASEAN Engineers Code of Practice.

ASEAN ENGINEERS REGISTER

Engineers aware of their professional responsibilities should strive to achieve competence in the following:

- An understanding of the engineering profession and of the registrants' responsibility to their colleagues, employers or clients, to the community at large, and to the environment;
- A thorough knowledge of the principles of engineering, based on mathematics, physics and informatics, appropriate to their discipline;
- A general knowledge of good engineering practice in their field of engineering and the properties, behavior, fabrication and use of materials, components and software;
- Knowledge of the use of technologies relevant to their field of specialization;
- Use of technical information and statistics;
- The ability to develop and use theoretical models from which the behavior of the physical world can be predicted;
- A capacity to exercise independent technical judgments through scientific analysis and synthesis;
- An ability to work on multi-disciplinary projects;
- Knowledge of industrial relations and the principles of management, taking into account technical, financial and human considerations;
- Skills in communication, both oral and written, including the ability to write clear reports;
- An ability to apply the principles of good design in the interest of ease of manufacture and maintenance, and quality at economical cost;
- An active appreciation of the progress of technical changes and of the continuing need not to rely solely on established practices but to cultivate an attitude of innovation and creativity in the exercise of the profession of engineering;
- An ability to assess conflicting and multifarious factors (e.g. cost, quality, safety and time-scale) both in the short and long terms and to find the best engineering solution;
- An ability to provide for environmental considerations;
- The capacity to mobilize human resources;
- Fluency in one other language apart from the mother tongue.

APEC ENGINEER



Asia-Pacific
Economic Cooperation

There is an agreement in place between a number of APEC countries for the purposes of recognizing “substantial equivalence” of professional competence in engineering. APEC countries can apply to become members of the agreement by demonstrating that they have in place systems which allow the competence of engineers to be assessed to the agreed international standard set by the APEC Engineer agreement.

Benefits

Registration on the IntPE register with APEC Engineer benefits ensures that professional engineers in New Zealand have the opportunity to have their professional standing recognized within the APEC region thereby contributing to the globalisation of professional engineering services. This is of particular benefit to engineering firms that are providing services to other APEC economies but it also adds value to individuals who may wish, at some stage, to work in these economies.

Each member economy of the APEC agreement has given an undertaking that the extra assessment required to be registered on the local professional engineering register will be minimized for those registered under the APEC Engineer agreement.

APEC ENGINEER

An APEC Engineer is defined as a person who is recognized as a professional engineer within an APEC economy, and who has satisfied an authorized body in that economy, operating in accordance with the criteria and procedures approved by the APEC Engineer Coordinating Committee, that they have:

- completed an accredited or recognized engineering program, or assessed recognized equivalent; and**
- been assessed within their own economy as eligible for independent practice; and**
- gained a minimum of seven years practical experience since graduation; and**
- spent at least two years in responsible charge of significant engineering work; and**
- maintained their continuing professional development at a satisfactory level.**

In addition all practitioners seeking registration as APEC Engineers must also agree 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; and be**
- held individually accountable for their actions, both through requirements imposed by the licensing or registering body in the jurisdictions in which they work and through legal processes.**

INTERNATIONAL PROFESSIONAL ENGINEERS (IntPE) REGISTER

(Finalized in year 2000)

The Engineers Mobility Forum agreement is a multi-national agreement between engineering organizations in the member jurisdictions which creates the framework for the establishment of an international standard of competence for professional engineering, and then empowers each member organization to establish a section of the International Professional Engineers (IntPE) Register.

The standard of competence applied is the same as for the APEC Engineer Agreement. Most of the APEC agreement members are also members of the EMF agreement, but the latter is truly global so that countries such as the United Kingdom, Ireland and South Africa have become members of EMF even though they cannot join the APEC agreement.

ENGINEERS MOBILITY FORUM

Members have full rights of participation in the agreement; each operates a national section of the International Professional Engineer (IntPE) Register; registrants on these national sections may receive credit when seeking registration or licensure in the jurisdiction of another member.

Australia - Represented by [Engineers Australia \(1997\)](#)

Canada - Represented by [Engineers Canada \(1997\)](#)

Hong Kong China - Represented by [The Hong Kong Institution of Engineers \(1997\)](#)

Ireland - Represented by [Engineers Ireland \(1997\)](#)

Japan - Represented by [Institution of Professional Engineers Japan \(1999\)](#)

Korea - Represented by [Korean Professional Engineers Association \(2000\)](#)

Malaysia - Represented by [Institution of Engineers Malaysia \(1999\)](#)

New Zealand - Represented by [Institution of Professional Engineers NZ \(1997\)](#)

Singapore - Represented by [Institution of Engineers Singapore \(2007\)](#)

South Africa - Represented by [Engineering Council of South Africa \(1997\)](#)

Sri Lanka - Represented by [Institution of Engineers Sri Lanka \(2007\)](#)

United Kingdom - Represented by [Engineering Council UK \(1997\)](#)

United States - Represented by [United States Council for International Engineering Practice \(1997\)](#)

Provisional Members have been identified as having competence assessment systems developing towards equivalence to those of full Members; they do not currently operate national sections of the International Professional Engineer register.

Bangladesh - Represented by [Bangladesh Professional Engineers, Registration Board](#)

India - Represented by [Institution of Engineers India](#)

The IntPE(NZ) register meets the requirements of two international agreements - the APEC Engineer Agreement (13 APEC Economies) and Engineers Mobility Forum Agreement (13 countries), and lists professional engineers meeting the IntPE(NZ) competence standard and additional specific qualification and work experience requirements. ***These are that registrants must hold a Washington Accord accredited qualification***; have two years responsible engineering experience and seven years post-graduation professional engineering experience. IntPE(NZ) registrants must undertake on-going assessments at intervals not exceeding 5 years to remain on the register, hence IntPE(NZ) registrants are regarded as being 'currently competent'. Registration on the IntPE(NZ) register entitles the registrant to use 'IntPE(NZ)' as a post-nominal and call themselves an 'APEC Engineer'.

INTERNATIONAL ENGINEERING ALLIANCE (IEA)

The various agreements and accords have formed an alliance, the IEA. The IEA holds biennial meetings at which the members review policies and procedures, consider reviews of participating organization performance in respect of the requirements in the agreements, and consider applications for membership. The participants may also agree to meet for specific purposes (e.g. policy development) between the two-yearly meetings.

Since 2000 the biennial meeting schedule has been as follows:

**2001 South Africa
2003 New Zealand
2005 Hong Kong
2007 USA
2009 Japan**

PUTTING EVERYTHING TOGETHER

Discussions between IEA and ENAEE

Glossary of terms and words to be developed in parallel

Detailed comparison of EUR-ACE and WA criteria

A common standard or, failing that, a connecting document

If successful these efforts will truly globalize engineering education and practice. There could be one “substantial equivalency” accord in education and one global engineers’ register.

MEMBERSHIP IN THE WASHINGTON ACCORD IS ONE OF THE REQUIREMENTS FOR ADMISSION TO THE IntPE REGISTER.

CRITERION OF THE EMF:

ACADEMIC ACHIEVEMENT SUBSTANTIALLY EQUIVALENT TO THAT OF A GRADUATE HOLDING AN ENGINEERING DEGREE ACCREDITED UNDER THE TERMS OF THE WASHINGTON ACCORD.

ACCEPTABLE SYSTEM OF ACCREDITATION

KEYED TO GLOBAL ENGINEERING PRACTICE

OUTCOMES-BASED & CQI-PROMOTING

INDUSTRY-LINKED

INDEPENDENT OF SCHOOLS

LED BY PROFESSIONAL ENGINEERING SOCIETIES

ABET

ENGINEERING-WIDE DESIRED PROGRAM OUTCOMES

Engineering programs have to demonstrate that their students, after undergoing the program, acquire:

- An ability to apply knowledge of mathematics, physical, life, and information sciences, engineering sciences appropriate to the field of practice.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within identified constraints.
- An ability to work effectively in multi-disciplinary and multi-cultural teams.

ABET

ENGINEERING-WIDE DESIRED PROGRAM OUTCOMES

Engineering programs have to demonstrate that their students, after undergoing the program, acquire:

- An ability to recognize, formulate, and solve engineering problems.
- A recognition of professional, social, and ethical responsibility.
- An ability to effectively communicate orally and in writing using the English language.
- An understanding of the effects of engineering solutions in a comprehensive context.
- An ability to engage in life-long learning and an understanding of the need to keep current of the developments in the specific field of practice.
- An ability to use the techniques, skills, and engineering tools necessary for engineering and business practice.

THANK YOU!

Range of Problem Solving

	Attribute	Complex Problems	Broadly-defined Problems	Well-defined Problems
1	Preamble	Engineering problems which cannot be resolved without in-depth engineering knowledge, much of which is at, or informed by, the forefront of the professional discipline, and have some or all of the following characteristics:	Engineering problems which cannot be pursued without a coherent and detailed knowledge of defined aspects of a professional discipline with a strong emphasis on the application of developed technology, and have the following characteristics	Engineering problems having some or all of the following characteristics:
2	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues	Involve a variety of factors which may impose conflicting constraints	Involve several issues, but with few of these exerting conflicting constraints

	Attribute	Complex Problems	Broadly-defined Problems	Well-defined Problems
3	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models	Can be solved by application of well-proven analysis techniques	Can be solved in standardised ways
4	Depth of knowledge required	Requires research-based knowledge much of which is at, or informed by, the forefront of the professional discipline and which allows a fundamentals-based, first principles analytical approach	Requires a detailed knowledge of principles and applied procedures and methodologies in defined aspects of a professional discipline with a strong emphasis on the application of developed technology and the attainment of know-how, often within a multidisciplinary engineering environment	Can be resolved using limited theoretical knowledge but normally requires extensive practical knowledge

	Attribute	Complex Problems	Broadly-defined Problems	Well-defined Problems
5	Familiarity of issues	Involve infrequently encountered issues	Belong to families of familiar problems which are solved in well-accepted ways	Are frequently encountered and thus familiar to most practitioners in the practice area
6	Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering	May be partially outside those encompassed by standards or codes of practice	Are encompassed by standards and/or documented codes of practice
7	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs	Involve several groups of stakeholders with differing and occasionally conflicting needs	Involve a limited range of stakeholders with differing needs

	Attribute	Complex Problems	Broadly-defined Problems	Well-defined Problems
8	Consequences	Have significant consequences in a range of contexts	Have consequences which are important locally, but may extend more widely	Have consequences which are locally important and not far-reaching
9	Interdependence	Are high level problems including many component parts or sub-problems	Are parts of, or systems within complex engineering problems	Are discrete components of engineering systems

Range of Engineering Activities

	Attribute	Complex Activities	Broadly-defined Problems	Well-defined Problems
1	Preamble	Complex activities means (<i>engineering</i>) activities or projects that have some or all of the following characteristics:	Broadly defined activities means (<i>engineering</i>) activities or projects that have some or all of the following characteristics:	Well-defined activities means (<i>engineering</i>) activities or projects that have some or all of the following characteristics:
2	Range of resources	Involve the use of diverse resources (and for this purpose resources includes people, money, equipment, materials, information and technologies)	Involve a variety of resources (and for this purposes resources includes people, money, equipment, materials, information and technologies)	Involve a limited range of resources (and for this purpose resources includes people, money, equipment, materials, information and technologies)

	Attribute	Complex Activities	Broadly-defined Problems	Well-defined Problems
3	Level of interactions	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues,	Require resolution of occasional interactions between technical, engineering and other issues, of which few are conflicting	Require resolution of interactions between limited technical and engineering issues with little or no impact of wider issues
4	Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways.	Involve the use of new materials, techniques or processes in non-standard ways	Involve the use of existing materials techniques, or processes in modified or new ways

	Attribute	Complex Activities	Broadly-defined Problems	Well-defined Problems
5	Consequences to society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation	Have reasonably predictable consequences that are most important locally, but may extend more widely	Have consequences that are locally important and not far-reaching
6	Familiarity	Can extend beyond previous experiences by applying principles-based approaches	Require a knowledge of normal operating procedures and processes	Require a knowledge of practical procedures and practices for widely-applied operations and processes

IEA Graduate Attributes and Professional Competency Profiles

Knowledge Profile

A Washington Accord programme provides:	A Sydney Accord programme provides:	A Dublin Accord programme provides:
<ul style="list-style-type: none">•A systematic, theory-based understanding of the natural sciences applicable to the discipline (e.g. calculus-based physics)	<ul style="list-style-type: none">•A systematic, theory-based understanding of the natural sciences applicable to the sub-discipline	<ul style="list-style-type: none">•A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline
<ul style="list-style-type: none">•Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline	<ul style="list-style-type: none">•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	<ul style="list-style-type: none">•Procedural mathematics, numerical analysis, statistics applicable in a sub-discipline

A Washington Accord programme provides:

- A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline

- 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.

A Sydney Accord programme provides:

- A systematic , theory-based formulation of **engineering fundamentals** required in an accepted sub-discipline

- engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for an accepted sub-discipline

A Dublin Accord programme provides:

- A coherent procedural formulation of **engineering fundamentals** required in an accepted sub-discipline

- engineering **specialist knowledge** that provides the body of knowledge for an accepted sub-discipline

A Washington Accord programme provides:

•knowledge that supports **engineering design** in a practice area

•knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline

•**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;

A Sydney Accord programme provides:

•knowledge that supports **engineering design** using the technologies of a practice area

•knowledge of **engineering technologies** applicable in the sub-discipline

•**comprehension of** the role of technology in society and identified issues in applying engineering technology: ethics and impacts: economic, social, environmental and sustainability

A Dublin Accord programme provides:

•knowledge that supports **engineering design** based on the techniques and procedures of a practice area

•codified **practical engineering knowledge** in recognised practice area.

•**knowledge** of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

A Washington Accord programme provides:	A Sydney Accord programme provides:	A Dublin Accord programme provides :
<ul style="list-style-type: none"> •Engagement with selected knowledge in the research literature of the discipline 	<ul style="list-style-type: none"> •engagement with the technological literature of the discipline 	
<p>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.</p>	<p>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.</p>	<p>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.</p>

Graduate Attribute Profiles

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
1	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization 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.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
2	Problem Analysis	Complexity of analysis	Identify, formulate, research literature and analyse <i>complex</i> engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	Identify, formulate, research literature and analyse <i>broadly-defined</i> engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation.	Identify and analyse <i>well-defined</i> engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
3	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	Design solutions for <i>complex</i> 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.	Design solutions for <i>broadly-defined</i> engineering technology problems and <i>contribute to</i> the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	Design solutions for <i>well-defined</i> technical problems and <i>assist with</i> the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
4	Investigation	Breadth and depth of investigation and experimentation	Conduct investigations of <i>complex</i> problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Conduct investigations of <i>broadly-defined</i> problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.	Conduct investigations of <i>well-defined</i> problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
5	Modern Tool Usage	Level of understanding of the appropriateness of the tool	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to <i>complex</i> engineering activities, with an understanding of the limitations.	Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to <i>broadly-defined</i> engineering activities, with an understanding of the limitations.	Apply appropriate techniques, resources, and modern engineering and IT tools to <i>well-defined</i> engineering activities, with an awareness of the limitations.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
6	The Engineer and Society	Level of knowledge and responsibility	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice.	Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
7	Environment and Sustainability	Type of solutions	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.	Understand the impact of engineering technology solutions in societal societal and environmental context and demonstrate knowledge of and need for sustainable development.	Understand the impact of engineering technician solutions in societal societal and environmental context and demonstrate knowledge of and need for sustainable development.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
8	Ethics	Understanding and level of practice	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.	Understand and commit to professional ethics and responsibilities and norms of technician practice.
9	Individual and Team work	Role in and diversity of team	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.	Function effectively as an individual, and as a member or leader in diverse technical teams.	Function effectively as an individual, and as a member in diverse technical teams.

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
10	Communication	Level of communication according to type of activities performed	Communicate effectively on <i>complex</i> 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.	Communicate effectively on <i>broadly-defined</i> 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	Communicate effectively on <i>well-defined</i> 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

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
11	Project Management and Finance	Level of management required for differing types of activity	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a technical team and to manage projects in multidisciplinary environments

		Differentiating Characteristic	... for Washington Accord Graduate	... for Sydney Accord Graduate	... for Dublin Accord Graduate
1 2	Life long learning	Preparation for and depth of continuing learning.	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.	Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.	Recognize the need for, and have the ability to engage in independent updating in the context of specialized technical knowledge.