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

The HISTORY of THE AFRICA, ASIA AND THE PACIFIC ACCORD *(AAP ACCORD)*

Africa, Asia and the Pacific Accord (AAP Accord)
Secretariat Address:

FEIAP c/o The Institution of Engineers, Malaysia , Bangunan Ingenieur, Lots 60 & 62, Jalan 52/4, 46720, Petaling Jaya, Selangor, Malaysia
Email: feiapofficial@gmail.com

Federation of African Engineering Organisations(FAEO),
Suite 205, NEC Building, National Engineering Centre, Off National Mosque
Labour House Road, Central Business District, Abuja, Nigeria.
Email: info@faeo.org

The HISTORY of

THE AFRICA, ASIA AND THE PACIFIC ACCORD (AAP ACCORD)

INTRODUCTION

The Africa, Asia and the Pacific Accord (AAP Accord) is an agreement aimed to establish a comprehensive framework of substantial equivalence for the accreditation systems of academic qualifications and the assessment systems of the engineering personnel between the signatory economies of the Accord. The engineering personnel comprises engineers, engineering technologists, and engineering technicians. This accord was reached between the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and the Federation of African Engineering Organizations (FAEO). A regional register of engineering personnel will be established covering economies in the Africa, Asia, and Pacific regions.

ORGANISATIONS

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

FEIAP was established with the aim of promoting the application of technological advancements for global economic and social progress, advancing engineering as a profession for the benefit of all people, and fostering worldwide peace. Originally known as The Federation of Engineering Institutions of Southeast Asia and the Pacific (FEISEAP), it was founded on 6 July 1978. During its 14th General Assembly in Cebu, Philippines, on 26 November 2007, unanimous agreement was reached to continue the Federation, provided that its constitution underwent a thorough review to clarify its objectives and broaden the eligibility for membership. A special general assembly convened in Hanoi, Vietnam, on 2 June 2008, resulting in the adoption of a constitutional amendment changing its name to the Federation of Engineering Institutions of Asia and the Pacific (FEIAP). FEIAP is a regional member of the World Federation of Engineering Organizations (WFEO).

The FEIAP Engineering Education & Accreditation Guidelines was established to build knowledge capabilities, attributes, skills, and values which equip the graduate for entry to practice in the career category of engineer. The second stage of formative development occurs as the new graduate works for a period of time, under supervision as a member of the engineering team, and develops the mature competencies for independent practice and registration as an engineer, which are the basic requirements of the academic for the engineers.

The FEIAP Engineering Education & Accreditation has been endorsed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) Jakarta Office in 2015). *See Attachment C for the UNESCO – ISCTIC Handout.*

Federation of African Engineering Organisations (FAEO)

FAEO serves as an international non-governmental organization advocating for the interests of all engineering professionals across Africa, particularly within the World Federation of Engineering Organizations (WFEO). During the 2011 World Engineers' Convention in Geneva, Switzerland, representatives of African engineering institutions convened a meeting on 7 September 2011, at the International Conference Centre, Geneva. Among their resolutions was

the decision to convene a General Assembly (GA) of African Engineering Organizations in Nairobi, Kenya, scheduled for April 2012. However, logistical challenges prevented the GA from taking place as planned, leading to its eventual convening on May 8, 2012, at the Kenyatta International Conference Centre in Nairobi, Kenya. This assembly marked the dawn of a new era for the entire engineering community in Africa, unifying its voice as an international member of the World Federation of Engineering Organizations (WFEO). FAEO aspires to become the foremost engineering professional body offering sustainable development solutions for the betterment of humanity in Africa. Its mission includes promoting and advancing the science and practice of engineering for the benefit of society in Africa and worldwide.

FEIAP INITIATIVE ON AFRICA, ASIA AND THE PACIFIC ACCORD (AAP ACCORD)

The concept of establishing the Africa, Asia, and the Pacific Accord (AAP) was first proposed by Ir. Dr. Tan Yean Chin (FEIAP Secretary General) and Academician Professor Emeritus Dr. Chuah Hean Teik (Chairman of FEIAP Engineering Education Standing Committee) to then President of FAEO Engr. Martin Manuhwa in a virtual meeting to discuss on the development of inclusive engineering education accreditation system for developing economies in Africa, Asia and the Pacific in year 2019. The AAP Accord aims to assist not only the economies within the FEIAP Asia and the Pacific region but also any other economies seeking support in enhancing their engineering standards through the 2-phase effort outlined in the FEIAP Engineering Education Guidelines. This initiative seeks to elevate the engineering standards of interested economies to meet the international substantial equivalence of standards such as WA or Euro-Ace, with potential extension to African member economies, as fully endorsed by FAEO in alignment with their vision and objectives. FEIAP Engineering Guidelines were endorsed by UNESCO Office for Asia and the Pacific Region in Jakarta in 2015. The APEC Engineer Register Agreement accepts an engineering degree recognised by FEIAP as a qualification that fulfils the basic academic requirement.

With hard work and dedications from both FAEO and FEIAP executive council members, the Memorandum of Understanding (MoU) was signed on 11 June 2020 to develop the AAP Accord. FAEO was represented by President Engr. Martin Manuhwa and witnessed by Executive Director Eng. Ovens Ehimatie, while FEIAP was represented by President Prof. Dr. Huang Wei and witnessed by Ir. Dr. Tan Yean Chin (FEIAP Secretary General). *See Attachment A for the MoU*.

After 9 months and many meetings to finalise the Africa, Asia and the Pacific Accord (AAP Accord), finally on 16 April 2021 the AAP Accord was officially signed between FAEO and FEIAP. FAEO was represented by their new President Ing. (Mrs.) Carlien Bou-Chedid and witnessed by Executive Director Eng. Ovens Ehimatie. FEIAP was represented by President Prof. Dr. Huang Wei and witnessed by Ir. Dr. Tan Yean Chin (FEIAP Secretary General). The signing ceremonies was witnessed by then President of the World Federation of Engineering Organizations (WFEO), Prof Gong Ke, officials from UNESCO in Asia, the Pacific and regions in Africa; and members of FAEO and FEIAP. *See Attachment B for the full AAP Accord*.

The AAP Accord serves as a platform for mutual recognition of the engineering workforce through an accreditation system based on the "FEIAP Engineering Education Guidelines" or its equivalent (FAEO Guideline), covering Graduate Engineers, Engineering Technologists, and Engineering Technicians, and extending the scope of the FEIAP Engineering Guidelines. The AAP Accord builds upon the joint activities outlined in the MoU to effectively elevate the standards of engineering education across Africa, Asia, and the Pacific regions.

In essence, the AAP Accord aims to achieve the following objectives:

- To have a unified & inclusive engineering education accord that promotes substantial equivalence of engineering education for engineers, engineering technologists and engineering technicians in Africa, Asia and the Pacific and economies in the Belt and Road Initiative region.
- To facilitate the rationalization of the standards of engineering graduates for crosseconomy employment, subject to other immigration and legal requirement of each member economy.
- To promote mobility of engineering workforce in Africa, Asia and the Pacific.
- To promote understanding of civilizations in these regions via cultivation of cultural intelligence in engineering education.

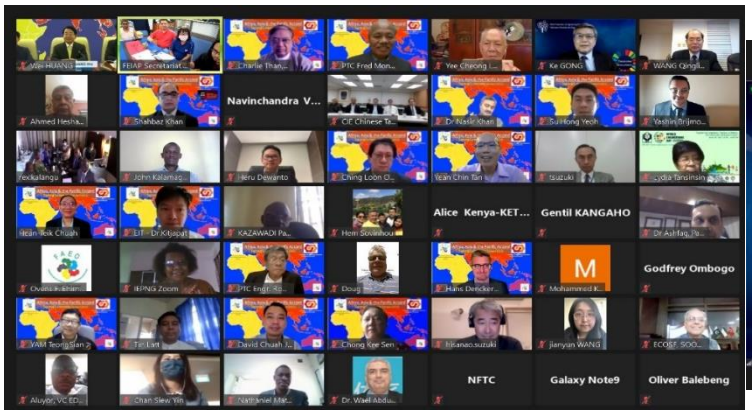
By fostering compatibility of standards and procedures, the AAP Accord aims to pave the way for a more integrated approach to engineering education among member economies, thereby encouraging and facilitating mobility while striving for substantial equivalence.

The first AAP Accord Engineering Education Council was appointed in April 2021 with the following members:

1. Tan Sri Professor Emeritus Dr Chuah Hean Teik, Malaysia (Chair)
2. Eng. Yashin Brijmohan, South Africa (Co-Chair)
3. Prof. Emeritus. Dr Douglas Hargreaves, Australia
4. Dr. Heru Dewanto, Indonesia
5. Dr. Nasir M Khan, Pakistan
6. Prof. Charlie Than, Myanmar
7. Eng. Martin Manuhwa, Zimbabwe
8. Engr. Prof. Adisa A. Bello, Nigeria
9. Eng John Kalamagye, Rwanda
10. Ing. Dr. Lucy Agyepong, Ghana\

Supported by FEIAP Secretariat office headed by Secretary General Ir. Dr. Tan Yean Chin


Signing Ceremony :
Africa, Asia and the Pacific Accord
(AAP Accord)
16th April 2021
FAEO President :
Ing. (Mrs.) Carlien Bou-Chedid
FEIAP President :
Prof. Dr. Huang Wei
Federation of African Engineering Organisations (FAEO)
Federation of Engineering Institutions of Asia and the Pacific (FEIAP)


Navinchandra V...
Alice Kenya-KET...
Gentil KANGAHO
Godfrey Ombogo
NFTC
Galaxy Note9
Oliver Balebeng


World Federation of Engineering Organizations
ENGINEERING FOR DEVELOPMENT

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

FAEO

ATTACHMENTS TO AAP ACCORD

Africa, Asia and the Pacific Accord (AAP Accord)
Secretariat Address:

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Email: feiapofficial@gmail.com

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

FAEO

ATTACHMENT A

MoU

Africa, Asia and the Pacific Accord (AAP Accord)
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Federation of Engineering Institutions of Asia and the Pacific (FEIAP)

MEMORANDUM OF UNDERSTANDING

BETWEEN

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

AND

THE FEDERATION OF AFRICAN ENGINEERING ORGANIZATIONS (FAEO)

Secretariat Address:

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Jalan 52/4, 46720, Petaling Jaya, Selangor DE, Malaysia
Email: feiapofficial@gmail.com

Federation of African Engineering Organisations(FAEO),
Suite 205, NEC Building, National Engineering Centre, Off National Mosque
Labour House Road, Central Business District, Abuja, Nigeria.
Email: info@faeo.org

PREAMBLE

This Memorandum of Understanding (MoU) is made between: The Federation of Engineering Institutions of Asia and the Pacific, henceforth referred to as 'FEIAP', whose secretariat is located at c/o The Institution of Engineers, Malaysia , Bangunan Ingenieur, Lots 60 & 62, Jalan 52/4, 46720, Petaling Jaya, Selangor DE, Malaysia and the Federation of African Engineering Organisations henceforth referred to as 'FAEO', whose offices are located at Suite 205, NEC Building, National Engineering Centre, Off National Mosque – Labour House Road, Central Business District, Abuja, Nigeria.

WHEREAS FEIAP, on the one part aims to facilitate the exchange of information and ideas related to engineering amongst the member organizations within the Asia and Pacific and to promote an advance the science of the profession of engineering in any or all its branches of engineering and disciplines and wishes:

- To foster cooperation and the exchange of information between its Members;
- To facilitate the exchange of members of engineering institutions between different economies in the region;
- To encourage the formation and to foster the activities of institutions of engineers in the region;
- To sponsor meetings, symposia and congresses of regional interest and relevance;
- To study issues concerning the education, continuing professional development and qualifications of engineers;
- To cooperate with international, regional and governmental and non-governmental organizations and to encourage engineers in the region to contribute to the activities of these organizations.

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WHEREAS FAEO, is recognized by International Organizations as the overall leader of the Engineering Profession in Africa and sets out to apply Engineering to serve humanity through the use of best practiced technology. The Objective of the Federation shall be to develop, in the spirit of African unity, direct relationship between its several member organizations on a basis of mutual understanding, so that their activities may be fostered and directed to the greater public good and, in particular:

- Harmonization of appropriate engineering standards to enhance advancement of knowledge in critical areas required for development.
- To build engineering capacity in Africa.
- To promote the advancement of engineering science and practice and their applications for the benefit of mankind.
- To collaborate with other national and international organizations, as it may think fit, to and support the implementation of the Sustainable Development Goals.

WHEREAS the Parties have agreed to cooperate and work together in:

- the establishment and provision of Capacity Building and Continuing Professional Development Programmes for Engineers;
- the promotion of thought leadership activities for Engineers and to foster cooperation between organisations within all the fields of engineering in Africa and Asian and the Pacific Region.
- the conduct of joint scientific and engineering meetings, symposia, conventions,congresses and the like.
- promote mutual understanding through joint engineering projects especially the Engineering Education, ICT and broadband projects for Africa through participation.

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Email: info@faeo.org

NOW THEREFORE, the Parties who are signatories to this Memorandum of Understanding (MoU) further agree as follows:

COMMON OBJECTIVES

1. The Institutions wish to work closer together to:
    a. Provide additional value to members of respective Institutions
    b. Promote the common goals of both Institutions
    c. Advance the interests of the engineering profession generally

ARRANGEMENTS

2. To achieve the above goals, the following facilities will be made available to members of each Organization who are resident in either host country or in Africa:
    a. Attendance at meetings of the host Organisation where applicable and on invitation (other than Annual and Special General Meetings which are concerned with internal business).
    b. Participation in the activities of any local associations, branches or groups in the host country on invitation.

3. Where appropriate, the Organizations are encouraged to jointly organise seminars, conferences and meetings of mutual interest.

MARKETING AND PROMOTION

4. Each Organization may refer this MoU in any advertising or promotion provided that the details have been discussed with, and agreed by, the other Organization.

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5. The Organizations may request the immediate withdrawal of promotional materials that do not comply with their corporate identity and/or include inappropriate or misleading information.

TERM

6. This MoU will commence from the date of signing by both parties and will remain in place for a period of four years, and will be deemed renewed if no party has terminated or modified it in terms of section 7 or 8 below.

7. Either Organization may terminate this MoU by giving six weeks written notice to the other Organization.

8. This MoU may be modified or renewed at anytime by mutual consent of the Organizations.

COMMUNICATION & JOINT ACTIVITIES

9. The Organizations would utilise their secretariats as well as nominate designated contacts who will, on behalf of each Organization, liaise on strategic matters and review the relationship between the Organizations.

   The initial objectives are to collaborate in:

   - Joint Conferences and Conventions, Engineeering Education Training and Research and Development.
   - partner in activities under the ambits of WFEO and IEA programmes.
   - Jointly take part in the Africa Moonshot Project in common workgroups in the UN broadband and World Bank activities.
   - engage in common CPD, capacity building and capability building.
   - any specific project to be decided upon jointly at a later stage.

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Federation of African Engineering Organisations(FAEO),
Suite 205, NEC Building, National Engineering Centre, Off National Mosque
Labour House Road, Central Business District, Abuja, Nigeria.
Email: info@faeo.org

The signatories and named contacts are:

FOR FEIAP

Name: Prof. Dr. Huang Wei
Role: President, The Federation of Engineering Institutions of Asia and the Pacific
Email: iamwhuang@nwpu.edu.cn
Secretariat Telephone: 603 - 7968 4001/2

Name: Ir. Dr. Tan Yean Chin
Role: Secretary General, Federation of Engineering Institutions of Asia and the Pacific
Email: feiapofficial@gmail.com / tanyeanchin@gmail.com
Telephone: +6012-2894933

FOR FAEO

Name: Eng.Martin Manuhwa
Role: President, Federation of African Engineering Organizations
Email: president@faeo.org, mmanuhwa1@yahoo.com
Telephone: +263773803310 or +234 803 3345 810

Name: Eng. Ovens Ehimatie
Role: Executive Director,Federation of African Engineering Organizations
Email: executivedirector@faeo.org
Telephone: +234 803 3345 810

GENERAL

10. This MoU constitutes a statement of the way in which the Institutions will work together to achieve their common objective.
11. This MoU is not legally binding.
12. Nothing in this MoU shall be deemed to be a commitment or obligation of funds from either Organization. The Organizations acknowledge that all or any financial arrangements must be negotiated and shall depend upon the availability of funds at the specific time.

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

SIGNATURES

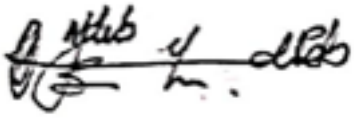
11 June 2020

For

The Federation of African Engineering Organizations

Eng. Martin Manuhwa

President

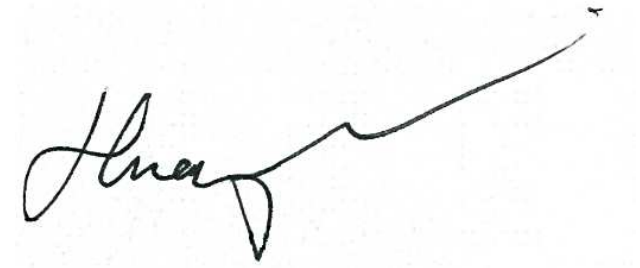


Eng. Ovens Ehimatie

Executive Director

For

The Federation of Engineering Institutions of Asia and the Pacific



Prof. Dr. Huang Wei

President

Ir. Dr. Tan Yean Chin

Secretary General

Secretariat Address:

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

ATTACHMENT B

Full AAP Accord

Africa, Asia and the Pacific Accord (AAP Accord)
Secretariat Address:

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

AFRICA, ASIA AND THE PACIFIC ACCORD (AAP ACCORD)

BETWEEN

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

AND

The Federation of African Engineering Organizations (FAEO)

Africa, Asia and the Pacific Accord (AAP Accord)
Secretariat Address:

FEIAP c/o The Institution of Engineers, Malaysia , Bangunan Ingenieur, Lots 60 & 62, Jalan 52/4, 46720, Petaling Jaya, Selangor, Malaysia
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Suite 205, NEC Building, National Engineering Centre, Off National Mosque
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PREAMBLE

A Memorandum of Understanding (MOU) was signed by the President of Federation of Engineering Institutions of Asia and the Pacific (FEIAP) Academician Prof. Huang Wei and President of Federation of African Engineering Organisations (FAEO) Eng. Martin Manuhwa on 2 July 2020 which was witnessed by President of World Federation of Engineering Organisations (WFEO) Academician Prof. Gong Ke. FEIAP and FAEO agree to develop a comprehensive framework for accreditation of education qualifications and competency of engineering personnel not only within their own jurisdictions or economies but also internationally. It also aims to establish an Accord to facilitate recognition of substantial equivalence of engineering qualifications based on FEIAP Engineering Education and Accreditation Guidelines and to recognise other equivalent international standards acceptable to both organisations.

Both FAEO and FEIAP agree to name the accord as Africa, Asia and the Pacific Accord (AAP Accord). It is to be an agreement aiming to develop a framework of substantial equivalence for the accreditation systems of academic qualifications and the assessment systems of the engineering personnel between the signatory economies of the Accord. The engineering personnel include engineers, engineering technologists and engineering technicians. There will be an established regional register of engineering personnel within the Africa, Asia and the Pacific including economies in the Belt and Road Region.

The member economies within FAEO and FEIAP wishing to join the AAP Accord are voluntary and are committed to developing and recognising the good practices for globalisation and eventual mutual recognition of the related qualifications.

1.0 INTRODUCTION

The Africa, Asia and the Pacific Accord (AAP Accord) is an agreement between Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and Federation of African Engineering Organisations (FAEO), which creates the framework for the establishment of an international standard of engineering education and empowers each member jurisdiction or economy of FAEO and FEIAP to establish a section of the Register for engineering graduate engineers, engineering technologists and engineering technicians.

The AAP Accord will facilitate the mobility of engineering graduates (i.e. engineers, engineering technologists and engineering technicians) holding suitable qualifications which are considered by the Accord to be of substantial equivalence. Signatories though

voluntary must be committed to promoting good practices in engineering education. The activities of the Accord should include developing exemplars of the graduates' profiles for the relevant types of engineering qualifications to facilitate mobility especially in Africa, Asia and the Pacific including economies in the Belt and Road Region. Other international organisations that shared the same vision and objectives with this Accord can also apply to join.

This AAP Accord should be able to pave the way to a more integrated approach to engineering education amongst member economies, and hence encourage and facilitate mobility. The AAP Accord allows compatibility of standards and procedures, and aims to achieve substantial equivalence.

The AAP Accord is to facilitate achievement of substantial equivalence of engineering education standards and compatibility of registration of engineering personnel, and eventually mutual recognition for mobility of engineering personnel, subject to fulfilment of immigration and other legal requirements of individual member economy.

2.0 OBJECTIVES

- To have a unified & inclusive engineering education accord that promotes substantial equivalence of engineering education for engineers, engineering technologists and engineering technicians in Africa, Asia and the Pacific and economies in the Belt and Road Initiative region.

- To facilitate the rationalization of the standards of engineering graduates for cross-economy employment, subject to other immigration and legal requirement of each member economy.

- To promote mobility of engineering workforce in Africa, Asia and the Pacific.

- To promote understanding of civilizations in these regions via cultivation of cultural intelligence in engineering education

3.0 FOUNDATION DOCUMENTS

This Accord will provide a platform for mutual recognition of the substantial equivalence of the engineering academic qualifications and for promotion of mobility of engineering work force for AAP Graduate Engineers, AAP Graduate Engineering Technologists and AAP Graduate Engineering Technicians.

A. Governance Documents

The Accord comprises of the Governance, Rules and Procedures. It will be an Agreement of substantial equivalence standards and quality assurance systems for academic qualifications. It will aim to establish an international benchmark for competence standards for education of engineering personnel in the jurisdiction or economy so as to facilitate mobility of these graduate personnel in the member economies of FAEO and FEIAP.

B. Rules and Procedures

Mandatory requirements and protocols which expand the governance documents. These are changeable according to a defined process after a notice period to FAEO and FEIAP of any proposed change.

C. Guidelines

Representing the "norm" of how things are done within the context of the Accord, which are however not mandatory. These are changeable according to a defined process after a notice period to FAEO and FEIAP of any proposed change.

Whilst governed independently of each other, the three engineering graduate personnel will have adopted the principle that where possible Rules and Procedures and Guidelines should be similar. This has meant the adoption of a common glossary, and led to a development of generic documents which apply to the Accord unless a specific exception is stated. Accordingly, there is only one set of Rules and Procedures in Section B, and only one set of Guidelines in Section C.

4.0 GOVERNANCE DOCUMENTS

4.1 AAP Graduate Engineers

Recognition of equivalence of educational base for Engineers at the Graduate Level.

A person in the engineering profession who is competent by virtue of fundamental education and training to apply scientific method and outlook to the analysis solution in complex engineering problems and having an accredited engineering degree from an institution of higher learning in a particular branch of engineering in which he is trained, specialised and allowed to practice.

4.2 AAP Graduate Engineering Technologists

Recognition of equivalence of educational base for Engineering Technologists at the Graduate Level.

A person who is part of the technological field that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities, with combined occupational spectrum of engineering and craftsmanship. Possess an accredited engineering technology degree from an institution of higher learning in a particular branch of engineering in which he is trained, specialized and allowed to practice.

4.3 AAP Graduate Engineering Technicians

Recognition of equivalence of educational base for Engineering Technicians at the Graduate Level

A person who is a certified holder of a certificate or diploma course who has the skill in specific areas and is able to support the engineering profession as technical assistant or having attended a programme through which practitioners normally satisfy the academic requirements for the engineering roles with the different name scenarios in different member economies.

5.0 AGREEMENT

1. Accreditation of engineering academic programmes is a key foundation for the practice of engineering at the graduate level in each of the member economies of FAEO and FEIAP covered by the Accord, and both parties agree:

    a) that the criteria, policies and procedures used by the signatories in accrediting engineer, engineering technologist or engineering technician academic programmes including quality assurance processes and practice are comparable and of substantial equivalence;

    b) that the accreditation/recognition decisions rendered by economy

members of FAEO and FEIAP are acceptable to the other member economies, and that those member economies will so indicate by publishing statements to that effect in an appropriate manner within their jurisdictions;

c) to identify, and to encourage the implementation of, best practice, as agreed from time to time amongst the member economies of FAEO and FEIAP, for the academic preparation of engineering personnel intending to practice at the graduate level and;

d) to continue mutual monitoring and information exchange by whatever means considered most appropriate,

e) to have regular communication and sharing of information concerning their accreditation criteria, systems, procedures, manuals, publications and lists of accredited programmes;

f) to ensure invitations to observe accreditation/recognition visits; and invitations to observe meetings of any boards and / or commission within FAEO and FEIAP, and meetings of the governing bodies of the member economies.

2. FAEO and FEIAP will make every reasonable effort to promote mobility and cross-border employment of AAP graduate engineers/engineering technologists/engineering technicians at graduate level, subject to immigration and other legal requirements prevailing in each member economy.

3. The admission of new member economies of FAEO and FEIAP to the Accord will require a positive vote by at least 2/3 votes at **AAP Engineering Education Council**, and will normally be preceded by a prescribed period of mentee status and provisional status, during which the accreditation criteria and procedures established by the member economy, and the manner in which those procedures and criteria are implemented, will be subject to comprehensive assessment and review.

4. Applicants for mentee status and provisional status must be nominated by two of the existing member economies of FAEO and FEIAP, and will be accepted only through a positive vote by at least 2/3 votes at **AAP Engineering Education Council**.

5. Appropriate Rules and Procedures will be established by member economies of FAEO and FEIAP as recommended by **AAP Engineering Education Council** to ensure that this Agreement can be implemented in a satisfactory and expeditious manner. The adoption of, or amendment to, such Rules and

Procedures will proceed only through a positive vote by at least 2/3 votes at **AAP Engineering Education Council**.

6. The management of the Accord will be by the **AAP Engineering Education Council**.

7. The **AAP Engineering Education Council** shall comprise of

   a) Chair and Co-Chair (FEIAP Chair for Standing Committee on Engineering Education, FAEO Engineering Education Chair or FAEO Capacity Building Chair) rotate every 3 years between FEIAP and FAEO.
   b) Council Members: 4 Representatives from FEIAP Engineering Education Standing Committee.
   c) Council Members: 4 Representatives from FAEO Engineering Education and Capacity Building Standing Committees.
   d) Secretariat: FEIAP Secretary General and FAEO Executive Director.
   e) Tenure of office is three (3) years. Members are eligible for reappointment once.

8. The administration of the Accord will be undertaken by the **FEIAP and the FAEO Secretariats** established and operated in accordance with the Rules and Procedures made under the provisions of this Accord.
9. The AAP Council will be accountable for the governance of the FAEO and FEIAP Constitutions and Rules and Procedures, and submit a half yearly Progress Report to FEIAP and FAEO.
10. The Accord will remain in effect for so long as it is acceptable and desirable to FAEO and FEIAP.
11. Any member economy wishing to withdraw from the Accord must give at least one year's notice to the AAP Engineering Education Council via FAEO or FEIAP.
12. Removal of any member economy from AAP Accord will require the affirmative vote of at least two-thirds of the votes at AAP Engineering Education Council.
13. No such removal will, of itself, affect standing granted prior to that cessation by other member economies, to engineering, engineering technologists or engineering technicians within the member economy.
14. Graduates from the accredited programmes are eligible to use the title of AAP Grad. Eng. (for engineers); AAP Grad. EngTs. (for engineering technologists) and AAP Grad.Tech. (for engineering technicians), after their names.

15. All member economies of FEIAP and FAEO are eligible for the membership of the Accord with the following classification: -

- **Mentee Membership** – Members who are yet to set up national Accreditation System. Mentee Members will be mentored by FEIAP and FAEO to set up the Accreditation System via training and sharing of experiences.
- **Provisional Membership** – Members who have been reviewed and certified fulfilling Phase 1 "Nation Building" of FEIAP Engineering Education and Accreditation Guidelines or its equivalent
- **Full Membership** – Members who have been reviewed and certified to be in full compliance with Phase 2 "International Substantial Equivalence" of FEIAP Engineering Education and Accreditation Guidelines or its equivalent (e.g. Washington Accord/ Euro-Ace etc).

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

SIGNATURES

16 April 2021

For

Federation of African Engineering Organizations

(FAEO)

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President

For

Federation of Engineering Institutions of Asia and the Pacific

(FEIAP)

Prof. Dr. Huang Wei

President

Eng. Ovens Ehimatie

Executive Director

Ir. Dr. Tan Yean Chin

Secretary General

ATTACHMENT

- **FEIAP Engineering Education and Accreditation Guidelines (For Engineers, Engineering Technologists and Engineering Technicians)**
- **FAEO-FEIAP MOU**

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

FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEER

30 December 2010
(Revised 12 July 2018)

FEIAP Standing Committee on Engineering Education

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

FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEER

30 December 2010
(Revised 12 July 2018)

FEIAP Engineering Education Working Group

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GLOSSARY OF KEY TERMS FOR ENGINEERING EDUCATION ACCREDITATION

NO.	TERM	DEFINITION
1	Accreditation	A process of self-study by the program and external peer review by appropriately trained and independent teams from both academia and engineering practice for quality assurance, accountability, and quality improvement of an academic program designed to determine whether or not it has met or exceeded the published standards of the accreditor and is achieving its missions and objectives. Success results in an accredited program. Accreditation of an engineering educational program is the primary process used to ensure the suitability of graduates of that program meeting the entry level of the engineering profession.
2	Accreditation Action	A judgment by an accrediting body regarding accreditation for institutions and/or programs. Includes, for example, accredited, denial of accreditation, probation, and warning. etc. *Also often called: decision; status.*
3	Accreditation Body	A body that develops accreditation standards and criteria and conducts peer review to assess whether or not those criteria are met. There are different types of accreditation bodies (e.g., agencies, councils, commissions, etc.), focused on general accreditation, specialized accreditation, professional accreditation, regional accreditation, national accreditation, distance education accreditation, etc. Generally, the accreditation body must make independent decisions without influence of education providers, government and other interest organizations.
4	Accreditation Cycle	Accreditation decisions are time-limited, normally good for five or six years. The duration of validity of the accreditation license is established by the accrediting body, which generally holds the right to suspend and/or to renew the license, upon the satisfactory resolution of any identified issues. *Also often called: duration of accreditation.*
5	Assessment	The process of the systematic gathering, quantifying, qualifying, and using information through a total range of written, oral and practical tests, as well as surveys, projects and portfolios, to judge the instructional effectiveness and the curricular adequacy in light of student learning outcomes. Assessment is necessary in order to validate a formal accreditation decision, but it does not necessarily lead to an accreditation outcome.
6	Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual. *See also: outcomes.*

NO.	TERM	DEFINITION
7	Graduate Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual upon graduation from a degree-granting program.
8	Benchmarks	Reference point or standard against which progress or outcomes may be measured and compared. Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programs in a specific term. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.
9	Best Practice	A superior method or an innovative process involving an actual accepted range of reasonable practices resulting in the improved performance of a higher education institution or program, usually recognized as “best” by other peer organizations. A best practice does not necessarily represent an absolute, ultimate example or pattern, the application of which assures the improved performance of a higher education institution or program; rather, it has to do with identifying the best approach to a specific situation, as institutions and programs vary greatly in constituencies and scope.
10	Competence	A concept which embodies the ability of an individual to transfer skills and knowledge to specific situations.
11	Continuous Professional Development	The planned acquisition of knowledge, experience and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineer's professional life.
12	Credit	The "currency" used to measure student workload in terms of the national learning time required to achieve specified learning outcomes. To each course unit a certain amount of credits are assigned. A credit system facilitates the measurement and comparison of learning outcomes achieved in the context of different qualifications, programs of study and learning environments.
13	Criteria	Checkpoints/benchmarks by which the attainment of certain objectives and/or standards can be examined. These involve expectations about quality, effectiveness, financial viability, compliance with national rules and regulations, outcomes, and sustainability. Criteria describe in a certain degree of detail the characteristics of the requirements and conditions to be met [in order to meet a standard] and therefore provide the (quantitative and/or qualitative) basis on which an evaluative conclusion is drawn.
14	Performance Criteria	Yardsticks/checkpoints/benchmarks that are used to judge the attainment of performance standards. As qualities, characteristics, or dimensions of a standard for student performance, they indicate how well students meet expectations of what they should know and be able to do, as expressed by varying gradients of success by (scoring) rubrics or by grades.
15	Curriculum	Comprehensive description of a study program. It includes learning objectives or intended outcomes, contents, assessment procedures.

NO.	TERM	DEFINITION
16	Degree	Qualification awarded to an individual by a recognized higher education institution after successful completion of a prescribed study program. In a credit accumulation system the program is completed through the accumulation of a specified number of credits awarded for the achievement of a specific set of learning outcomes.
17	Design	The process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic science and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The engineering design component of a curriculum must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specification, consideration of alternative solutions, feasibility considerations, production processes, concurrent engineering design, and detailed system description. Further it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics and social impact.
18	Effectiveness	An output of specific review/analyses that measure (the quality of) the achievement of a specific educational goal or the degree to which a higher education institution or a program can be expected to achieve specific requirements. It is different from efficiency, which is measured by the volume of output or input used. As a primary measure of success of a program or of a higher education institution, clear indicators, meaningful information, and evidence best reflecting institutional effectiveness with respect to student learning and academic achievement have to be gathered through various procedures (inspection, observation, site visits, etc.). Engaging in the measurement of educational effectiveness creates a value-added process through quality assurance and accreditation review and contributes to building, within the institution, a culture of evidence.
19	Efficiency	An ability to perform well or to achieve a result without wasted resources, effort, time, or money (using the smallest quantity of resources possible). Educational efficiency can be measured in physical terms (technical efficiency) or in terms of cost (economic efficiency). Greater educational efficiency is achieved when the same amount and standard of educational services are produced at a lower cost, if a more useful educational activity is substituted for a less useful one at the same cost, or if unnecessary educational activities are eliminated. A program or a higher education institution may be efficiently managed, but not effective in achieving its mission, goals, or objectives.

NO.	TERM	DEFINITION
20	Engineer	The term "engineer" refers to a professional dedicated to engineering. "Engineering" is defined as a profession in which engineers make full use of their knowledge in mathematical science, natural science, and science of the artificial, to develop, research, manufacture, operate, and maintain hardware and software of artificial device and systems that contribute to the welfare and security of mankind, through economic exploitation of resources and natural forces, with good perspective of the future impact of such exploitation on society and the environment. A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by four years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Washington Accord or its equivalent.
21	Engineering Technologist	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by three years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Sydney Accord or its equivalent. Also often called: Incorporated Engineer
22	Engineering Technician	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by two years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Dublin Accord or its equivalent.
23	Ethics	Moral issues and decisions confronting the individuals involved in engineering practice.
24	Indicators	Operational variables referring to specific empirically measurable characteristics of higher education institutions or programs on which evidence can be collected that allows for a determination of whether or not standards are being met. Indicators identify performance trends and signal areas in need for action and/or enable comparison of actual performance with established objectives. *See also: Criteria.*
25	Performance Indicators	A range of statistical parameters representing a measure of the extent to which a higher education institution or a program is performing in a certain quality dimension. They are qualitative and quantitative measures of the output (short-term measures of results) or of the outcome (long-term measures of outcomes and impacts) of a system or of a program. They allow institutions to benchmark their own performances or allow comparison among higher education institutions. Performance indicators work efficiently only when they are used as part of a coherent set of input, process, and output indicators. As higher education institutions are engaged in a variety of activities and target a number of different objectives, it is essential to be able to identify and to implement a large range of performance indicators in order to cover the entire field of activity.
26	Laboratory	Practical experimental class where the students are active and supervised by a staff member and/or assistants.

NO.	TERM	DEFINITION
27	Licensure	The process by which a governmental agency grants official permission to persons meeting predetermined qualifications to engage in a given occupation and/or use of a particular title. Licensure is usually obtained through examination or graduation from an accredited institution. In some countries, a period of practical experience may be required. *Also often called: licensing.*
28	Metrics	Specific statements identifying the performance required to meet specific standards, the performance is measurable, the performance is documentable.
29	Objectives	Short statements that describe the specific knowledge, skills, abilities and/or attitudes expected of graduates three to five years after graduation.
30	Outcomes	Specific knowledge, skills, abilities, and attitudes that students possess at graduation that lead to achievement of the program's objectives. An outcome must be distinguished from an objective. *Also often called: learning outcomes; student outcomes; attributes.*
31	Outcomes Assessment	The process of evaluation and improvement of specific results of a higher education program in order to demonstrate its effectiveness. Assessment may concern the performance of teaching staff, the effectiveness of institutional practices, and/or the functioning of departments or programs (e.g., program reviews, budget reviews, etc.). It is a formative procedure used for self-study, financial retrenchment, program evaluation, and better understanding of the current needs of students.
32	Peer	Increasingly used for "evaluator" or "panel member" in a quality assurance and/or accreditation process, to underline that it is a "peer process."
33	Profile	List of attributes for specific competencies.
34	Program	It is a generic term to represent departments and courses concerned. Programs here are not confined to those provided solely by a department within a faculty as is typically the case with the majority of the universities. A program can consist of multiple departments, while a department can provide multiple programs. It is desirable that the name of a newly established program appropriately represents the program's specialized field of study, clearly indicating its learning or educational objectives, so that it can be precisely recognized by the public.
35	Qualification	A generic term that usually refers an award granted for the successful completion of a study program, in accord to the standard set by an institution of education in a particular filed of study. A qualification is important in terms of what it signifies: competencies and range of knowledge and skills. Sometimes it is equivalent to a license to practice.
36	Professional Qualification	The set of requirements necessary for access to a profession, in particular a regulated profession.

NO.	TERM	DEFINITION
37	Quality	The extent to which a course, the teaching activities and the provider's facilities help students achieve worthwhile learning goals. Quality in higher education is a multi-dimensional, multi-level, and dynamic concept that relates to the contextual settings of an educational model, to the institutional mission and objectives, as well as to specific standards within a given system, institution, program, or discipline.
38	Quality Assurance	An all-embracing term referring to an ongoing, continuous process of evaluating (assessing, monitoring, guaranteeing, maintaining, and improving) the quality of a higher education system, institutions, or programs. As a regulatory mechanism, quality assurance focuses on both accountability and improvement, providing information and judgments (not ranking) through an agreed upon and consistent process and well-established criteria. The scope of quality assurance is determined by the shape and size of the higher education system. *Also often called: quality control; quality management.*
39	Recognition	The provision by which a body or institution (recognizer) considers another body or institution (recognized) appropriate or competent for a certain purpose.
40	Academic Recognition	Approval of courses, qualifications, or diplomas from one (domestic or foreign) higher education institution by another for the purpose of student admission to further studies. Academic recognition can also be sought for an academic career at a second institution and in some cases for access to other employment activities on the labor market (academic recognition for professional purposes).
41	Mutual Recognition	Agreement by two or more institutional bodies to validate each other's degrees, programs, or institutions and/or affirmation by two or more quality assurance or accrediting agencies that the methodology of the agencies are sound and that the procedures are functioning accordingly.
42	Review	The general process of a systematic and critical analysis leading of assessment data to judgments and/or recommendations regarding the quality of a higher education institution or a program. Evaluation is carried out through internal or external procedures. *See also: Accreditation.*
43	Interim Review	A checkpoint during the accreditation cycle to monitor the continuous improvement of the program.
44	Monitoring Review	A periodic evaluation of the accreditation body by its peers on its effectiveness of reviewing the programs and on its fulfillment to meet the requirements of the collective peers.
45	Self-study	The review and evaluation of the quality and effectiveness of an institution's own academic programs, staffing, and structure, based on standards set by an outside quality assurance body, carried out by the institution itself. Self-studies usually are undertaken in preparation for a quality assurance site visit by an outside team of specialists. Results in a self-study report.

NO.	TERM	DEFINITION
46	Site Visit	Site visit is normally part of the accreditation process, which is conducted by a team of peer reviewers who, after examining the institution's or the program's self-study, interview faculty, students, and staff; and examine the structure and effectiveness of the institution and its academic programs.
47	Standards	The level of requirements and conditions that must be met by institutions or programs to be accredited or certified by a quality assurance or accrediting agency. These conditions involve expectations about quality, attainment, effectiveness, financial viability, outcomes, and sustainability.
48	Substantial Equivalent	The recognition by an organization/competent authority that a course unit, a study program or degrees awarded by different institutions of higher education are equivalent. When not considered complete, equivalence is often qualified as substantial equivalence.

ORGANIZATIONAL ACRONYMS

A. Organizations

ACRONYM	ORGANIZATION
AAES	American Association of Engineering Societies
ABEEK	Accreditation Board for Engineering Education of Korea
ABET	ABET, Inc.
ANETL	National Association Engineers of Timor Leste
AICTE	All India Council for Technical Education
ASIIN	German Accreditation Agency for Study Programs in Engineering and Informatics
ASME	The American Society of Mechanical Engineers
BAETE	Board of Accreditation for Engineering and Technical Education, Bangladesh
BEC	Board of Engineers Cambodia
BEM	Board of Engineers Malaysia
BPERB	Bangladesh Professional Engineers Registration Board
CAST	China Association for Science and Technology
CCTT	Canadian Council of Technicians and Technologists
CEAB	Canadian Engineering Accreditation Board of Engineers Canada
CIE	Chinese Institute of Engineer
CIP	The College of Engineers of Peru
COE	Council of Engineers, Thailand
COREN	Council for the Regulation of Engineering in Nigeria
CTAEMC	Chinese Taipei APEC Engineer Monitoring Committee
CTEMC	Chinese Taipei Engineer Mobility Committee
EA	Engineers Australia (formerly known as Institution of Engineers Australia)
EAC	Engineering Accreditation Council, Malaysia
EC	Engineers Canada
ECSA	Engineering Council of South Africa
ECUK	Engineering Council United Kingdom
EI	Engineers Ireland
EIT	The Engineering Institute of Thailand under the King's Patronage
FIE	Institution of Engineers, Fiji
HKIE	The Hong Kong Institution of Engineers
IEET	Institute of Engineering Education Taiwan
IEB	The Institution of Engineers, Bangladesh
IEI (India)	The Institution of Engineers (India)
IEM(My)	The Institution of Engineers, Malaysia
IEM	The Institution of Engineers, Mauritius
IEPNG	The Institution of Engineers, Papua New Guinea
IES	The Institution of Engineers, Singapore
IESL	The Institution of Engineers, Sri Lanka

ACRONYM	ORGANIZATION
IPEJ	Institution of Professional Engineers Japan
IPENZ	Institution of Professional Engineers New Zealand
JABEE	Japan Accreditation Board for Engineering Education
KIVI	Royal Institute of Engineers, Netherlands
KPEA	Korean Professional Engineers Association
LUSEA	Lao Union of Science and Engineering Associations
MES	Myanmar Engineering Society
MEC	Myanmar Engineering Council
NBA-AICTE	National Board of Accreditation of All India Council for Technical Education
PATE	Philippine Association for Technical Education
PEC	Pakistan Engineering Council
PII	Persatuan Insinyur Indonesia (The Institution of Engineers Indonesia)
PRB	Professional Regulatory Board (Philippines)
PTC	The Philippine Technological Council
PUJA	Pertubuhan Ukur Jurutera & Arkitek
RAEE	Russian Association of Engineering Education
UNCIEP	United States Council for International Engineering Practice
VUSTA	Vietnam Union of Science and Technology Associations

1.0 THE FEIAP ENGINEERING EDUCATION ACCREDITATION SYSTEM MODEL FRAMEWORK FOR ENGINEER

The FEIAP Engineering Education Guidelines for Engineer incorporate a model framework for the accreditation system and are adaptive to the needs of member economies. The Engineering Education Model framework for Engineer will guide the development of an engineering program accreditation system that focuses on delivery of assured engineering graduate outcomes appropriate to a particular economy at a particular stage in development. The following phased development sequence is projected:

- Engineering graduate capabilities appropriate to a period of 'nation building';
- Engineering Graduate capabilities benchmarked against FEIAP Education Guideline for Engineer or Washington Accord under the International Engineering Alliance (IEA) or other equivalent systems.

The FEIAP Engineering Education Accreditation System Model Framework for Engineer will provide guidance on the development of accreditation system documentation such as an engineering graduate outcomes specification; specific accreditation criteria and associated performance indicators and expectations; self-review submission requirements, accreditation processes and governance.

1.1 Graduate Outcomes Specification

Engineering involves the application of mathematics, natural and physical sciences, and a substantive body of knowledge to the solution of complex problems within broad and often uncertain contexts. Engineering practice needs to be carried out responsibly and ethically, manage risks and be accountable for the entire life cycle of a solution and its effects. Engineering practice must consider economic, public health, safety, legal, social, environment and sustainability factors and engineering practitioners must have the skills and attributes to communicate and work in teams with professionals in wide ranging fields.

Engineering practice skills and knowledge development is a lifelong process, and begins very much with a foundation education qualification. The fundamental purpose of this educational foundation is to build knowledge capabilities, attributes, skills and values which equip the graduate for entry to practice in the career category of engineer. The second stage of formative development occurs as the new engineering graduate works for a period of time, under supervision as a member of the engineering team, and develops the mature competencies for independent practice and registration as an engineer. In parallel with continuing professional development, the foundation education qualification provides the required educational basis for independent practice and registration.

The prime objective of an accreditation system is to evaluate the engineering educational experiences and assessment processes being provided in the foundation engineering education program, and to pass judgment on the appropriateness and quality of the engineering graduate outcomes that are projected as a consequence of the engineering educational experiences.

Outcomes-based accreditation criteria will address wide ranging factors that influence the standard of engineering graduate outcomes, and these will include inputs and processes, as well as direct observation of certain outcomes.

To facilitate such an evaluation it is critical that the Engineering Education Accreditation Body is able to provide a benchmark statement of expected engineering graduate outcomes in the particular career category. Such a statement will provide a key reference for both engineering education developers as well as those involved in developing and implementing the accreditation criteria and processes. The benchmark statement of expected engineering graduate outcomes will most certainly comprise a generic component that is applicable to all fields of practice. It may well also provide some discipline specific graduate outcome guidelines which address the underpinning skills and knowledge, specialist technical competence and engineering application abilities within designated fields of practice. This level of detail in the outcomes specification is more likely however to be the responsibility of the engineering educational provider in consultation with stakeholders, as the educational design process unfolds for a particular engineering program within a nominated discipline.

Any foundation engineering education program must be based on a defined graduate outcomes specification that sets out the capability targets for engineering graduates in the particular career category as clear, succinct, assessable statements that cover underpinning knowledge and skills, technical competencies, engineering application capability as well as personal and professional attributes, capabilities, values and attitudes. Such a specification for an individual education program must be demonstrably compliant with the corresponding benchmark statement of engineering graduate outcomes set out by the engineering education accreditation body if the program is to be considered for accreditation within the economies of the engineering education accreditation body. The benchmark statement of engineering graduate outcomes set by the engineering education accreditation body thus drives the processes of educational design and program accreditation.

In order to ensure the substantial equivalence of engineering graduates from engineering programs which arise across the boundaries of accreditation economies, it is essential that the benchmark statements of engineering graduate outcome expectations set up by various engineering education accreditation bodies satisfy a common point of reference or standard. To help facilitate this, the Washington Accord under the International Engineering Alliance (IEA) has published a Graduate Attributes Exemplar Statement for Engineer (Appendix 1). This Statement sets out a generic knowledge profile as well as generic attributes which are expected to characterise engineering graduates within a particular career category. The Exemplar Statement provides a template or framework for Engineering Education Accord signatories as they in turn establish localised benchmark statements of engineering graduate outcome expectations. The Exemplar Statement thus assists in achieving substantial equivalence of engineering graduate outcome expectations across education programs and across accreditation economies. The economy's benchmark statement of outcomes is naturally tuned to the needs of engineering practice within the geographic economy of the Accord signatory, and subsequently provides a

framework for engineering education providers as they devise the detailed specification of graduate outcomes for an engineering education program in any particular engineering discipline.

The Graduate Attributes Exemplar Statement of Engineers published under the IEA is commended as a useful guideline reference for established and emerging accreditation bodies within FEIAP. This Statement provides a generic standard for the knowledge profile and the attributes against which engineering graduates must be able to perform. Each Exemplar Statement is generic in nature and so is universally applicable to all engineering disciplines. Each knowledge and attribute element has a common stem with separate range qualifiers set out to identify the appropriate outcomes for engineer. The International Engineering Alliance has published a companion Exemplar Statement for the mature practitioner, to assist with the achievement of substantial equivalence within the registration/licensing process. This Statement is titled – 'Professional Competency Profile' and mirrors the corresponding 'Graduate Attributes Exemplar'.

The specification of graduate outcomes is thus formalised at three levels as shown in the Figure 1.1.

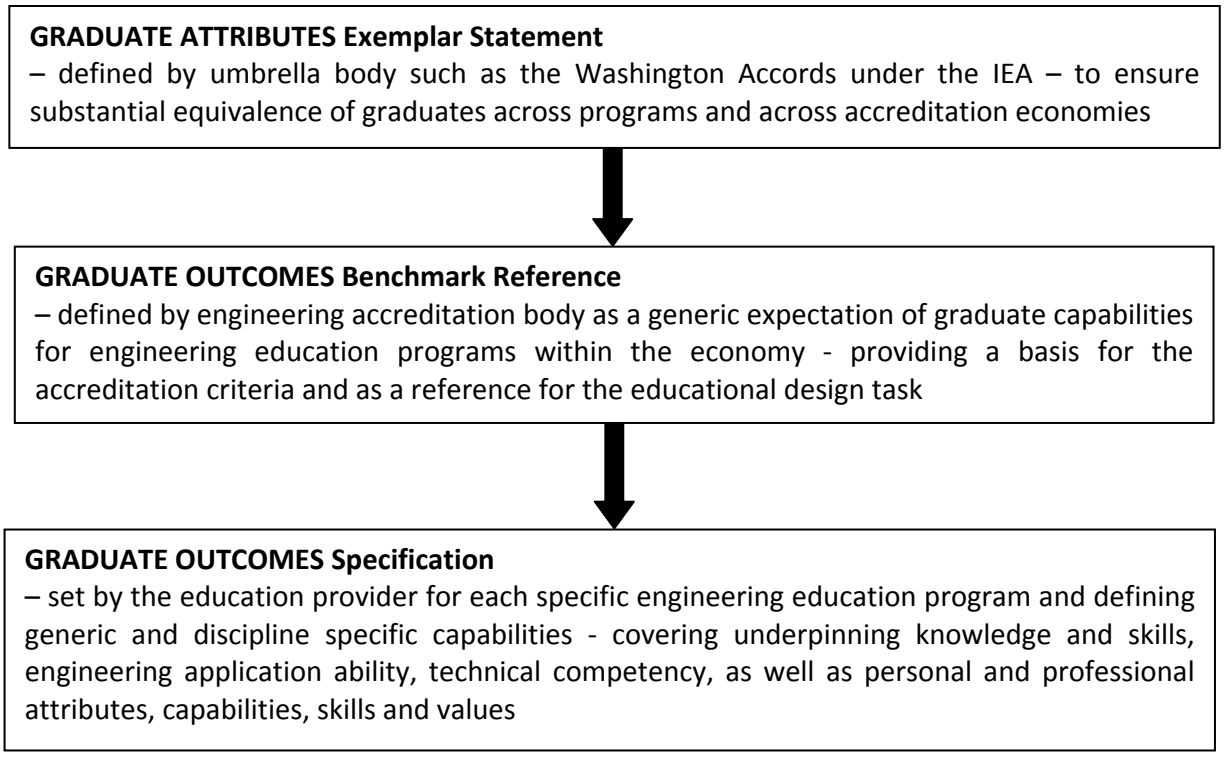

Figure 1.1 Hierarchy of references for ensuring substantial equivalence of engineering graduate outcomes between engineering education programs, within and across accreditation economies.

1.2 Accreditation Criteria

An outcomes-based accreditation system must evaluate the educational experiences and assessment processes set out in the foundation engineering education program, and pass

judgment on the appropriateness and quality of the engineering graduate outcomes that are projected as a consequence of the educational experiences.

Such an evaluation needs to be systematic and referenced to clearly defined criteria which address wide ranging factors that influence the standard of engineering graduate outcomes. An outcomes-based evaluation will require a holistic judgment of overall performance against the accreditation criteria.

Many of the elements of the evaluation will be subjective in nature. By definition, the process cannot be distilled down to simple objective measures testing compliance against prescribed requirement thresholds. The task is to consider inputs and processes as well as some outcome observations as collective data for predicting the satisfactory attainment of prescribed graduate outcomes.

A core requirement is for the engineering education provider, to establish the engineering program objectives and to develop a specification of targeted graduate outcomes, covering generic and discipline specific capabilities, knowledge, skills, attributes and values for each program under consideration. The determination of this specification should be undertaken in conjunction with industry stakeholders and should drive the engineering educational design phase, where the learning outcomes from individual activities or program modules systematically aggregate to deliver the targeted graduate outcomes. Individual assessment tasks undertaken throughout the study program need to systematically map against the delivery of the individual elements within the engineering graduate outcomes specification. This then provides a fundamental reference for systematically tracking attainment of outcomes in each individual engineering graduate.

The publication of clear accreditation criteria is an essential foundation for an outcomes-based accreditation system. The criteria must evaluate, rather than prescribe – curriculum, educational methodology, policies, processes and practices. The criteria must be widely understood, be evident from first principles, informed by stakeholders and maintained against international benchmarks. There must be an underlying quality cycle to ensure consistency and fairness, as well as closure of the loop on accreditation processes and practices. Evaluation processes must be documented and auditable.

Engineering educational providers must be required to have in place their own systems for educational development, industry engagement, determining performance measures and for continuing quality improvement.

The accreditation criteria must identify the key factors that will influence the delivery of appropriate engineering graduate outcomes. An engineering graduate outcomes benchmark reference is the key basis for the criteria and provides a generic template for engineering educational providers to establish the detailed, customised specification of engineering graduate outcomes that underpin each individual program.

Outcomes-based accreditation criteria accommodate innovation and diversity in educational design and in learning and assessment processes, but ensure engineering graduates are equipped with a comprehensive specification of knowledge, capabilities, attributes, skills and values.

Accreditation criteria must under all circumstances embrace:

- the educational environment;
- the program outcomes specification, educational design, structure, content and assessment processes;
- the underpinning quality systems.

FEIAP has published FEIAP Engineering Education Accreditation System Model Criteria as a resource for member economies embarking on the development of an outcome based accreditation system. This model will include sample performance indicators and guideline material.

As a guide, the three aspects of the accreditation criteria could contain elements such as those listed below.

EDUCATIONAL ENVIRONMENT:

- Organisational and management structure – commitment to engineering education;
- faculty and support staff profile;
- Academic leadership and educational culture; faculty engagement with outcomes-based educational design and delivery;
- Facilities and physical resources;
- Funding model;
- Strategic management of student profile.

PROGRAM DESIGN, STRUCTURE, CONTENT AND ASSESSMENT PROCESSES:

- Specification of program objectives and educational outcomes and compatibility with the graduate outcomes benchmark reference template defined within the accreditation system;
- Program title consistent with objectives and designated graduate outcomes;
- Mapping of learning design and assessment processes against delivery of specified graduate outcomes;
- Compliance with any program structural requirements or discipline specific templates;
- Tracking individual student performance against graduate outcomes;
- Exposure of students to professional engineering practice.

QUALITY SYSTEMS:

- Quality Policy ensuring commitment to the Quality Systems;
- Engagement with external constituencies – input to setting reviewing and assessing attainment of graduate outcomes;
- Feedback and stakeholder input to continuous improvement cycle;
- Processes for setting and reviewing objectives and the graduate outcomes specification;

- Approach to educational design and review;
- Approach to assessment and performance evaluation;
- Benchmarking practices;
- Governance processes and structure;
- Student administration systems.

1.3 Accreditation Process

The Engineering Education Accreditation Body must publish appropriate policies and procedures to provide clear and sufficient information as guidance for engineering programs seeking accreditation. These policies and procedures should include at least the following elements:

(1) Documents to be provided by engineering programs
The Engineering Education Accreditation Body must require engineering programs seeking accreditation to conduct and a full self-review process and submit a report documenting outcomes of the self-review. The self-review process must answer whether the engineering program fulfils requirements set out by the accreditation body. Specifically, the engineering program must provide sufficient evidence, through appropriate and diverse assessment means, to demonstrate that it fulfils the accreditation body's requirement on engineering graduate outcomes. The accreditation team will deliver preliminary findings from reviewing the report and verify their findings through the accreditation visit.

(2) Composition of accreditation team
The engineering education accreditation team should consist of at least two persons, preferably more, representing a balance of relevant experience and expertise as well as employment orientation, academics or industry. All members of the accreditation must be sufficiently trained and competent for conducting the review process. Conflict of interest is a critical issue in the accreditation process and must be taken into account in assembling the engineering education accreditation team. Each member of the accreditation team must submit a statement indicating partiality prior to his/her nomination.

(3) Duration of accreditation visit
The engineering education accreditation visit should last at least two days to allow sufficient time for documentation review and the interviews.

(4) Structure of the accreditation visit
The engineering education accreditation visit should include the following elements:

1. Preliminary meeting of the accreditation team prior to the visit to identify what information is to be obtained during the visit;
2. Meeting with educational institution's administrators;
3. Meeting with head of engineering program;
4. Meeting with academic staff members;
5. Meeting with support staff members;
6. Meeting with students;

7. Meeting with alumni;
8. Meeting with employers/industry/professional engineering organisation's representatives;
9. Visit of facilities;
10. Review of engineering project work, final papers and other documents (with regard to the standards and modes of assessment as well as to the learning outcomes of the students);
11. Feedback of the accreditation team at the end of the visit.

(5) Verification and validation of the report by the accreditation agency/commission
The engineering education accreditation body must provide a written report to the engineering program at the conclusion of the accreditation process. This report should state clearly the findings of the accreditation team in terms of concerns, weakness, and deficiency of the engineering education program. This information will not only support the delivery of accreditation decision but also directions for continuous improvement of the engineering education program.

(6) Decision on accreditation
The engineering education accreditation body must have a fair process to deliver accreditation decisions. The decision-making process needs to be transparent and those who are involved in the process must make informed decisions based on findings of the accreditation teams. The accreditation decision must clearly define the period of validity (the duration of which should not exceed a maximum of six years) and whether it refers to year of entry or year of graduation. After the limited validity of the accreditation has expired, the program must be submitted for re-accreditation. The accreditation decisions must be communicated clearly in written statement to the program.

(7) Publication of accreditation decisions
The engineering education accreditation body must make the accreditation decisions available to the public, normally through publishing list of accredited engineering education programs on its website or on printed materials. Engineering education programs fail to received accredited status are normally not published.

(8) Procedures of appeals
The engineering education accreditation body must have policies and procedures of appeals to ensure the rights of the engineering programs seeking accreditation when error in facts and/or error in procedures happen which causes the engineering programs receive unfavourable decisions. Appropriate conflict of interest procedures must be considered during the appeal process.

1.4 Governance of the Accreditation Body

(1) Official Status
The engineering education accreditation body must be authorities, agencies or institutions which are representative of the engineering community and which have statutory powers or recognised professional authority for accrediting engineering programs designed to satisfy the academic

requirements for admission to practicing status (e.g. licensing, registration or certification) within a defined economy (e.g. country, jurisdiction, geographical region).

(2) Mission Statement

The engineering education accreditation body must have clear and explicit goals and objectives for its work, contained in a publicly available statement. Specifically, the statement should declare that the accreditation process is a major activity of the engineering education accreditation body and that there exists a systematic approach to achieving its goals and objectives.

(3) Activities

The engineering education accreditation body must undertake the accreditation activities (at program level) on a regular basis. It should declare the career categories associated with programs/qualifications (Engineer) and disciplines that are recognised (electrical, civil, chemical, mechanical, etc.) as well as geographical bounds of accreditation activities. The engineering education accreditation body should also have effective process for the recruitment, selection, training & evaluation of program evaluators.

(4) Resources

The engineering education accreditation body must have adequate and proportional resources, both human and financial, to enable planning, operation and development of the entire engineering education accreditation activities in an effective and efficient manner.

(5) Leadership and Management

The engineering education accreditation body must have sustainable leadership and management structure to provide confidence and accountability of its accreditation activities. Individuals who hold leadership and management roles must possess credentials and expertise in relevant disciplines. The engineering education accreditation body should exercise in accordance with appropriate governance policies during leadership and management changes to enable stability at all times.

(6) Independence

The engineering education accreditation body must be independent to the extent both that they have autonomous responsibility for its operations and that the accreditation decisions it made cannot be influenced by third parties such as higher education institutions, ministries, legislatures, or other stakeholders.

(7) Accountability and Integrity

The engineering education accreditation body should have in place procedures for its own accountability and to maintain its integrity. These procedures enable the engineering education accreditation body to operate at all times in accordance with high standards of professionalism, ethics, and objectivity. Specifically,

1. The engineering education accreditation body has in place, and enforces, a non-conflict-of-interest mechanism that governs the work of its staff and its evaluators;

2. The engineering education accreditation body has in place internal quality assurance procedures which include an internal feedback mechanism (i.e. means to collect feedback from its own staff and council/board); an internal reflection mechanism (i.e. means to react to internal and external recommendations for improvement); and an external feedback mechanism (i.e. means to collect feedback from experts and reviewed institutions for future development) in order to inform and underpin its own development and improvement.
3. A mandatory cyclical external review of the agency's activities at least once every five or six years.

2.0 MENTORING SYSTEM

The FEIAP Engineering Education Guidelines for Engineer provide a structural framework for mentoring services provided under the FEIAP umbrella which will be made available to member economies. Mentoring will follow the FEIAP Engineering Education Accreditation System Model Framework for Engineer and lead to the phased development of accreditation systems and graduate outcomes that satisfy nation-building phase; and progress, leading to standards of equivalence with FEIAP Engineering Education Guideline for Engineer requirements or Washington Accord or other equivalent systems. The mentoring framework will detail mentoring principles, processes for appointment of mentoring teams, reporting mechanisms, expenses, continuation and termination of the mentoring services, and guidelines for mentors.

2.1 Participation

Organisations wishing to participate either as mentees or mentors must be FEIAP members. It will be the decision of the individual organisation as to whether it seeks mentoring support.

Mentoring under the FEIAP umbrella is quite separate to the mentoring services or the processes for seeking membership of other engineering education organisations such as Washington Accord. Having participated in a FEIAP Engineering Education mentoring relationship will not guarantee successful admission to any other international organisation.

2.2 Appointment and Qualification of Mentor

1. Mentoring is provided by individuals representing the mentor organisations, whereas the mentee is the organisation that receives the mentoring services.
2. Organisations may formally request mentors by lodging a request with the FEIAP Engineering Education Standing Committee.
3. When allocating mentoring organisations the FEIAP Engineering Education Accreditation Committee must be cognizant of the size of the proposed mentee organisation. Cognizance should also be taken of the geographical closeness of the mentors and mentee.
4. On receipt of a formal request from an organisation for mentoring, the FEIAP Engineering Education Standing Committee will assign at least two member organisations recognized by FEIAP or are signatories to the Washington Accord under the International Engineering Alliance. Each of these mentoring organisations will in turn nominate an appropriate representative person to serve on the mentoring team.
5. Those persons appointed to fulfil the mentoring process must be knowledgeable, with practical experience in the application of accreditation systems and the engineering education standards in place within their own economy.
6. Mentors act on behalf of the FEIAP Engineering Education Standing Committee, which must be informed of the agreed terms of reference of the mentoring relationship as well as when and what mentoring activities have been undertaken.

7. Mentoring relationships are arranged for a set purpose and for a set period of time. The purpose and time period should be negotiated between the mentee and the mentors and approved by the FEIAP Engineering Education Standing Committee.

2.3 Reporting

(1) Mentor to Mentee

Mentors may advise the mentee verbally and in writing. The advice is confidential to the mentors, their representing organisations and the mentee. Any release of the mentoring advice by mentors to third parties, including the FEIAP Engineering Education Standing Committee, must have consent of the mentee.

(2) Mentor Report to the FEIAP Engineering Education Standing Committee

Mentors or their representing organisations must report to the FEIAP Engineering Education Standing Committee after the mentoring relationship becomes effective and a mentoring visit took place. Schedules of the subsequent reports are at the mentors' judgment when significant progress or development occurs. Mentor reports shall include the following information:

- the agreed terms or reference of the mentoring relationship;
- the facts of mentor visits to the organisation of the mentee e.g. dates of visits, activities undertaken during the visit;
- a general statement as to the mentee's progress.

The mentee is encouraged to provide feedback on the mentoring experiences. If the mentee wishes, the mentor's report could be submitted to the FEIAP Engineering Education Standing Committee with the mentors' reference.

(3) FEIAP Engineering Education Standing Committee reporting to the FEIAP Executive Committee

The FEIAP Engineering Education Standing Committee will provide a status report to the FEIAP Executive Committee at the Executive Committee meetings about the development and progress of the mentoring services.

2.4 Expenses

Mentors are acting on behalf of the FEIAP Engineering Education Standing Committee, and the mentoring services are not consulting services. Therefore, mentors are strictly refrained from charging the mentee any fee for their services. However, expenses incurred as a result of the mentoring visits, such as airfare (less than five hours economy class, more than five, business class), visa application, accommodation, etc., shall be borne by the mentee.

2.5 Continuation and Termination of the Mentoring Services

Mentors are assigned by the FEIAP Engineering Education Standing Committee for a set period of time. However, if the mentee wishes to continue the services with the same mentors, the services can be continued by the mentors' consent and by informing the FEIAP Engineering Education Standing Committee.

Should a mentee or a mentor like to terminate the mentoring services either by the set time period or earlier, the FEIAP Engineering Education Standing Committee must be informed.

Written statements would be required either to continue or to terminate the mentoring services.

2.6 Guidelines for Mentors

1. Mentors must advise the mentees in accordance with the FEIAP Engineering Education Accreditation System Model Framework for Engineer.
2. Mentors must be familiar with and sensitive to the engineering educational system, the culture and environment of higher education, the development of engineering programs and the engineer registration system within the mentee economy. Subsequently, mentors must be sensitive, to the mentee's specific needs, progress plan and decision making regime.
3. Mentors must refrain from being judgmental in providing advice and must act in a professional and objective manner. In providing advice, mentors must observe the sovereignty and statutory requirements of the mentee economy.
4. The contents of mentoring reports must be objective and should provide observations and findings that clearly indicate the mentee's progress towards the phased development of accreditation systems and graduate outcomes that will satisfy nation building phase or FEIAP Engineering Education Guideline for Engineer/APEC Engineer/Washington Accord education requirements/other equivalent education requirements.
5. Mentors must be clear with their advice either in verbal or written format.
6. Mentors should encourage the mentee to become part of the community by attending engineering accreditation related meetings.
7. Members of the mentoring team are advised to work closely together with clear communication in order to maintain consistency with comment and advice.

2.7 Mentoring Provided by Individual Signatories

Organisations may approach individual economies directly to request support through a private mentoring arrangement. If a member accepts this request then they must inform the FEIAP Engineering Education Standing Committee so that other members are made aware of the private mentoring arrangement. The FEIAP Engineering Education Standing Committee cannot be responsible for the quality of advice and support provided through this private mentoring arrangement.

3.0 EVALUATION OF ACCREDITATION AGENCY

Member economies having developed accreditation systems under the FEIAP Engineering Education Guidelines for Engineer may apply for assessment and subsequent recognition under the FEIAP Engineering Education framework for Engineer. Assessment of accreditation criteria, practices and processes will be undertaken by a commissioned team of appropriate member representatives in order to evaluate the integrity and robustness of accreditation processes for assuring graduate outcome standards that meet the educational requirements of APEC Engineers and are appropriately referenced against the exemplar standards set by the Washington Accord. A judgment on a particular accreditation agency may lead to a classified recognition of an engineering education program. Two levels of recognition are available and are based on the level of maturity of the applicant agency's accreditation system and processes, as well as the qualifications (degree, advanced diploma, diploma or certificate) of compliance with the criteria that is set out under the FEIAP Engineering Education Guidelines for Engineer. The first level of compliance is appropriate to the 'nation-building' phase of the economy. The second level is to comply with the FEIAP Engineering Education Guideline for Engineer to meet with the academic requirements for APEC engineer registration. This second and third level of recognition may be accorded as an outcome of a first time evaluation of the applicant agency, or may be an outcome of a second judgment taken after a period of formation, and subsequent to an earlier recognition outcome at the 'nation building' level.

Ultimately such judgment must of course also reveal appropriateness of an accreditation agency to seek recognition under the Washington Accord or other equivalent systems. FEIAP Engineering Education Guidelines for Engineer will provide a structured evaluation framework and will detail submission requirements, processes for appointing evaluation teams, evaluation processes, and decision making. Economies with accreditation systems already recognized under the Washington Accord would not need to submit for such evaluation when seeking FEIAP membership.

3.1 Application

1. An accreditation agency (subsequently referred to as the Applicant) seeking FEIAP recognition should apply to the Standing Committee by submitting a completed Application Form and supporting documentation.
2. The application must be in English.
3. The entire application package (four paper copies and one electronic copy) must be received by the FEIAP Engineering Education Standing Committee no later than 120 days before the commencement of the FEIAP General Assembly at which the application is to be considered.
4. The application must be accompanied by written statements of nomination from two member economies, each nomination containing a declaration that the nominating economy considers that the Applicant's accreditation system meets the FEIAP requirements at one of the two levels of recognition outlined above.
5. A representative of the Applicant must appear in person at the FEIAP General Assembly to formally present the application and answer questions.

3.2 Documentation in Support of Applications

The documentation provided on the engineering education accreditation system should include the following sections:

(1) Accreditation Organisation

- Provide the name of the Applicant organisation.
- List the names of the officers of the organisation with brief CVs.
- Describe the affiliation of the organisation with other engineering bodies, government and industry within the economy.

(2) Introduction

- Provide general information about the economy and the context of engineering.

(3) Education

- Provide a description of primary, secondary, and tertiary education.
- Describe the nature of programs, including admission standards.
- Provide the number and type of engineering institutions and programs, indicating whether the institutions are public or private.

(4) Structure of the Engineering Community

- Describe the context of engineering practice and the degree of regulation (i.e. registration vs licensing).
- Describe if there is a protected title and scope of practice.
- Describe any differing categories of engineering practitioners and their academic requirements.
- Describe the relationship of the organisation to licensing, registration or certifying agencies, and the extent to which the organisation can influence the acceptance of accreditation by those agencies.

(5) Role of Engineering Education Accreditation

- Describe the role of engineering education accreditation in registration.
- Given that engineering education accreditation is normally voluntary, describe the degree of participation.

(6) Engineering Education Accreditation System

- Describe the development of the engineering education accreditation system and its maturity.
- Provide a description of the Engineering Education Accreditation Board including its composition and authority.
- List the objectives of accreditation.

- Provide the criteria for accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
- Provide detailed policies and procedures for conducting the accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of evaluation; organisation of the visit; due process).
- Provide a list of currently accredited programs and a schedule of upcoming evaluations.
- Describe relationships with external engineering organisations, including any agreements.

3.3 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person Review Team to assess the application. Each of the reviewers will represent a different member economy. Members of the Review Team should be completely independent of the Applicant and have the necessary knowledge, experience and expertise to conduct the review. The Applicant may request that reviewers be replaced, if there is a possible conflict of interest.

3.4 Evaluation Process

The evaluation process involves the following:

1. Evaluation of the submitted application and supporting documentation;
2. Observation and evaluation of at least two accreditation visits at cross-sectional institutions of the Applicant;
3. Observation and evaluation of the decision making process of the Applicant, in which the decisions on the observed accreditation visits are to be reached;
4. Submission of an evaluation report to the FEIAP Engineering Education Standing Committee recommending to the member economies whether the Applicant satisfies the FEIAP Engineering Education Guideline for Engineer requirements for recognition at one of the following levels:
   - 'nation building';
   - educational requirements base level education requirements that are expected under FEIAP Engineering Education Guideline for Engineer/Washington Accord or other equivalent systems.

3.5 Evaluation Standards

(1) Accreditation Standards

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

i. Graduate Outcomes Specification
ii. Education Environment
iii. Program Design, Structure, Content and Assessment Processes
iv. Quality Systems

(2) Accreditation Procedures

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

i. Documents to be Provided by Programs,
ii. Composition of Accreditation Team,
iii. Duration of Accreditation Visit,
iv. Structure of the Accreditation Visit,
v. Verification and Validation of the Report by the Accreditation Agency,
vi. Decision on Accreditation,
vii. Publication of Accreditation Decisions,
viii. Procedures of Appeals.

(3) Governance of the Accreditation Body

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

i. Official Status
ii. Mission Statement
iii. Activities
iv. Resources
v. Leadership and Management
vi. Independence
vii. Accountability and Integrity
Decision Making

3.6 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the report of the Review Team, and decide whether or not the Applicant should be recognized at either the 'nation building' level; or FEIAP Engineering Education Guideline for Engineer/APEC basic academic education/Washington Accord/other equivalent education level. The Applicant will be informed of the decision, and receive a final version of the report. The Applicant may ask, in writing, for further information about the decision.

If the decision is not to recognize the Applicant, the Applicant may appeal to the FEIAP Executive Council.

The maximum period of recognition is six years. Before the expiration of this period, a recognized accreditation agency should apply for re-evaluation to demonstrate ongoing compliance with requirements.

4.0 PERIODIC MONITORING OF ACCREDITATION AGENCY

Once a member economy has attained recognition under the FEIAP Engineering Education system, a periodic peer monitoring process will apply. FEIAP Engineering Education Guidelines for Engineer will provide an evaluation framework for assessing the on-going compliance of the accreditation system and the continuing standard of graduate outcomes. FEIAP Engineering Education Guidelines for Engineer will provide the monitoring framework and will detail submission requirements, processes for appointing monitoring review teams, monitoring processes, and decision making. Member economies with accreditation systems already recognized under the Washington Accord will be exempted from such periodic monitoring.

4.1 Submission of Documents

If the member economy under review is a non English speaking economy, English translations must be provided for the review team conducting the monitoring process. The documentation should be submitted no less than 60 days prior to the review team's visit and should include the following sections in English:

(1) Engineering Education Accreditation Organisation

- List the names of the officers of the organisation with brief CVs.
- Describe the affiliation of the organisation with other engineering bodies, government and industry within the economy.

(2) Role of Accreditation

- Describe the role of Engineering Education accreditation in registration.
- Given that Engineering Education accreditation is normally voluntary, describe the degree of participation.

(3) Engineering Education Accreditation System

- Provide a description of the Engineering Education Accreditation Board including its composition and authority.
- Provide the criteria for engineering education accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
- Provide detailed policies and procedures for conducting the engineering education accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of accreditation evaluation team; organisation of the visit; due process).
- Provide a list of currently accredited programs.

(4) Changes Made

- Provide information on changes made since last review.
- Provide information to demonstrate evidence of continuous improvement.

4.2 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person review team to conduct the monitoring process. Each of the reviewers represents a different member economy. Members of the review team should be completely independent of the member economy under review and have the necessary knowledge, experience and expertise to conduct the review. The member economy under review may request that reviewers be replaced, if there is a possible conflict of interest.

4.3 Evaluation Process

The review process involves the following:

1. Evaluation of the submitted documents;

2. Monitoring visit should include the following meetings:
- visit to the engineering education accreditation office of the member economy under review;
- observation and evaluation of at least two accreditation visits at cross-sectional institutions;
- post-visit team meeting to structure the monitoring report;
- observation and evaluation of the decision making process of the member economy under review, in which the decisions on the observed accreditation visits are to be reached.

3. Submission of an monitoring report to the FEIAP Engineering Education Standing Committee no less than 60 days prior to the next meeting of the FEIAP General Assembly recommending to the member economies whether the member economy under review continue to meet the FEIAP Engineering Education Guidelines for Engineer requirements for substantial equivalency. The report shall include:
- an executive summary outlining major system characteristics and citing recommended action with the appropriate action statement;
- an overall introduction to the accreditation system under review and its standards;
- information on accreditation policies, procedures and criteria for the system under review, including a comprehensive analysis of how the accreditation recognition process address marginal, difficult conditional actions;
- A brief description of the educational provider and a listing of the programs observed and accredited results in order set the context for the review;
- indications of any stated or observed substantial deviations to the accreditation criteria, policies or procedures of the system under review and the rationale for the change;
- a statement as to whether the standard of the graduates of accredited programs are substantially equivalent to graduates of other members of the FEIAP;
- any statement of weakness or deficiency; and
- recommended actions.

4.4 Evaluation Standards

(1) Accreditation Standards

The member economy under review must continue to be compliant with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

- Graduate Outcomes Specification;
- Education Environment;
- Program Design, Structure, Content and Assessment Processes;
- Quality Systems.

(2) Accreditation Procedures

The member economy under review must continue to be compliant with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

- Documents to be Provided by Programs;
- Composition of Accreditation Team;
- Duration of Accreditation Visit;
- Structure of the Accreditation Visit;
- Verification and Validation of the Report by the Accreditation Agency;
- Decision on Accreditation;
- Publication of Accreditation Decisions;
- Procedures of Appeals.

(3) Governance of the Accreditation Board

The member economy under review must continue to be compliant with the requirements stipulated in *FEIAP Engineering Education Accreditation System Model Framework for Engineer*:

- Official Status;
- Mission Statement;
- Activities;
- Resources;
- Leadership and Management;
- Independence;
- Accountability and Integrity.

(4) Continuous Improvement

The member economy under review must demonstrate that it continues to take measures to improve its accreditation system, not only for the purpose of fulfilling requirements of the *FEIAP Engineering Education Accreditation Criteria Template for Engineers* and the *FEIAP Engineering Education System Model Framework for Engineer,* but also for elevating its contribution to the development of engineering education within the economy as well as the FEIAP community.

4.5 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the monitoring report prepared by the review team, and confirm whether the member economy continues to meet the FEIAP Engineering Education Guideline for Engineer requirements for substantial equivalency. The categories of recommendations are:

1. The member economy under review be accepted by FEIAP for a period of six years, based on a determination that its accreditation processes lead to outcomes substantially equivalent to the systems known to the monitoring review team;

2. The member economy under review be accepted by FEIAP for a period of no more than two years subject to the submission of a report which satisfies that adequate steps are being taken to address the specific issues identified by the monitoring review team;

3. Due to serious deficiencies, the member economy is reclassified immediately to conditional status and that urgent and specific assistance be offered by FEIAP.

4.6 Expenses

Expenses incurred as a result of the periodic monitoring review, such as airfare (less than five hours, economy class; more than five, business class), visa application, accommodation, etc., must be borne by the member economy under review.

APPENDIX 1
Graduate Attribute Profiles for Engineer (International Engineering Alliance)

References to the Knowledge Profile are shown thus: (WK1 to WK4) (Refer to Appendix 2)

Differentiating Characteristic	Graduate Attribute
Engineering Knowledge:	**WA1:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.
Problem Analysis Complexity of analysis	**WA2:** Identify, formulate, research literature and analyse *complex* engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)
Design/ development of solutions: Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	**WA3:** Design solutions for *complex* engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)
Investigation: Breadth and depth of investigation and experimentation	**WA4:** Conduct investigations of *complex* problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
Modern Tool Usage: Level of understanding of the appropriateness of the tool	**WA5:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to *complex* engineering problems, with an understanding of the limitations. (WK6)
The Engineer and Society: Level of knowledge and responsibility	**WA6:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)
Environment and Sustainability: Type of solutions.	**WA7:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)
Ethics: Understanding and level of practice	**WA8:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)
Individual and Team work: Role in and diversity of team	**WA9:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

Differentiating Characteristic	Graduate Attribute
Communication: Level of communication according to type of activities performed	**WA10:** Communicate effectively on *complex* engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
Project Management and Finance: Level of management required for differing types of activity	**WA11:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
Lifelong learning: Preparation for and depth of continuing learning.	**WA12:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

APPENDIX 2
Knowledge Profiles for Engineer (International Engineering Alliance)

A Washington Accord programme provides:
WK1: A systematic, theory-based understanding of the **natural sciences** applicable to the discipline
WK2: Conceptually-based **mathematics**, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline
WK3: A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline
WK4: Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5: Knowledge that supports **engineering design** in a practice area
WK6: Knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline
WK7: Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability
WK8: Engagement with selected knowledge in the **research literature** of the discipline

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FEIAP

ENGINEERING EDUCATION GUIDELINES (Engineer)

30 December 2010
(Revised 12 July 2018)

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

FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEERING TECHNOLOGIST

12 July 2018

FEIAP Standing Committee on Engineering Education

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

FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEERING TECHNOLOGIST

12 July 2018

FEIAP Engineering Education Working Group

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GLOSSARY OF KEY TERMS FOR ENGINEERING EDUCATION ACCREDITATION

NO.	TERM	DEFINITION
1	Accreditation	A process of self-study by the program and external peer review by appropriately trained and independent teams from both academia and engineering practice for quality assurance, accountability, and quality improvement of an academic program designed to determine whether or not it has met or exceeded the published standards of the accreditor and is achieving its missions and objectives. Success results in an accredited program. Accreditation of an engineering educational program is the primary process used to ensure the suitability of graduates of that program meeting the entry level of the engineering profession.
2	Accreditation Action	A judgment by an accrediting body regarding accreditation for institutions and/or programs. Includes, for example, accredited, denial of accreditation, probation, and warning. etc. *Also often called: decision; status.*
3	Accreditation Body	A body that develops accreditation standards and criteria and conducts peer review to assess whether or not those criteria are met. There are different types of accreditation bodies (e.g., agencies, councils, commissions, etc.), focused on general accreditation, specialized accreditation, professional accreditation, regional accreditation, national accreditation, distance education accreditation, etc. Generally, the accreditation body must make independent decisions without influence of education providers, government and other interest organizations.
4	Accreditation Cycle	Accreditation decisions are time-limited, normally good for five or six years. The duration of validity of the accreditation license is established by the accrediting body, which generally holds the right to suspend and/or to renew the license, upon the satisfactory resolution of any identified issues. *Also often called: duration of accreditation.*
5	Assessment	The process of the systematic gathering, quantifying, qualifying, and using information through a total range of written, oral and practical tests, as well as surveys, projects and portfolios, to judge the instructional effectiveness and the curricular adequacy in light of student learning outcomes. Assessment is necessary in order to validate a formal accreditation decision, but it does not necessarily lead to an accreditation outcome.
6	Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual. *See also: outcomes.*

NO.	TERM	DEFINITION
7	Graduate Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual upon graduation from a degree-granting program.
8	Benchmarks	Reference point or standard against which progress or outcomes may be measured and compared. Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programs in a specific term. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.
9	Best Practice	A superior method or an innovative process involving an actual accepted range of reasonable practices resulting in the improved performance of a higher education institution or program, usually recognized as “best” by other peer organizations. A best practice does not necessarily represent an absolute, ultimate example or pattern, the application of which assures the improved performance of a higher education institution or program; rather, it has to do with identifying the best approach to a specific situation, as institutions and programs vary greatly in constituencies and scope.
10	Competence	A concept which embodies the ability of an individual to transfer skills and knowledge to specific situations.
11	Continuous Professional Development	The planned acquisition of knowledge, experience and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineer's professional life.
12	Credit	The "currency" used to measure student workload in terms of the national learning time required to achieve specified learning outcomes. To each course unit a certain amount of credits are assigned. A credit system facilitates the measurement and comparison of learning outcomes achieved in the context of different qualifications, programs of study and learning environments.
13	Criteria	Checkpoints/benchmarks by which the attainment of certain objectives and/or standards can be examined. These involve expectations about quality, effectiveness, financial viability, compliance with national rules and regulations, outcomes, and sustainability. Criteria describe in a certain degree of detail the characteristics of the requirements and conditions to be met [in order to meet a standard] and therefore provide the (quantitative and/or qualitative) basis on which an evaluative conclusion is drawn.
14	Performance Criteria	Yardsticks/checkpoints/benchmarks that are used to judge the attainment of performance standards. As qualities, characteristics, or dimensions of a standard for student performance, they indicate how well students meet expectations of what they should know and be able to do, as expressed by varying gradients of success by (scoring) rubrics or by grades.
15	Curriculum	Comprehensive description of a study program. It includes learning objectives or intended outcomes, contents, assessment procedures.

NO.	TERM	DEFINITION
16	Degree	Qualification awarded to an individual by a recognized higher education institution after successful completion of a prescribed study program. In a credit accumulation system the program is completed through the accumulation of a specified number of credits awarded for the achievement of a specific set of learning outcomes.
17	Design	The process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic science and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The engineering design component of a curriculum must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specification, consideration of alternative solutions, feasibility considerations, production processes, concurrent engineering design, and detailed system description. Further it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics and social impact.
18	Effectiveness	An output of specific review/analyses that measure (the quality of) the achievement of a specific educational goal or the degree to which a higher education institution or a program can be expected to achieve specific requirements. It is different from efficiency, which is measured by the volume of output or input used. As a primary measure of success of a program or of a higher education institution, clear indicators, meaningful information, and evidence best reflecting institutional effectiveness with respect to student learning and academic achievement have to be gathered through various procedures (inspection, observation, site visits, etc.). Engaging in the measurement of educational effectiveness creates a value-added process through quality assurance and accreditation review and contributes to building, within the institution, a culture of evidence.
19	Efficiency	An ability to perform well or to achieve a result without wasted resources, effort, time, or money (using the smallest quantity of resources possible). Educational efficiency can be measured in physical terms (technical efficiency) or in terms of cost (economic efficiency). Greater educational efficiency is achieved when the same amount and standard of educational services are produced at a lower cost, if a more useful educational activity is substituted for a less useful one at the same cost, or if unnecessary educational activities are eliminated. A program or a higher education institution may be efficiently managed, but not effective in achieving its mission, goals, or objectives.

NO.	TERM	DEFINITION
20	Engineer	The term "engineer" refers to a professional dedicated to engineering. "Engineering" is defined as a profession in which engineers make full use of their knowledge in mathematical science, natural science, and science of the artificial, to develop, research, manufacture, operate, and maintain hardware and software of artificial device and systems that contribute to the welfare and security of mankind, through economic exploitation of resources and natural forces, with good perspective of the future impact of such exploitation on society and the environment. A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by four years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Washington Accord or its equivalent.
21	Engineering Technician	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by two years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Dublin Accord or its equivalent.
22	Engineering Technologist	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by three years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Sydney Accord or its equivalent. Also often called: Incorporated Engineer
23	Ethics	Moral issues and decisions confronting the individuals involved in engineering practice.
24	Indicators	Operational variables referring to specific empirically measurable characteristics of higher education institutions or programs on which evidence can be collected that allows for a determination of whether or not standards are being met. Indicators identify performance trends and signal areas in need for action and/or enable comparison of actual performance with established objectives. *See also: Criteria.*
25	Performance Indicators	A range of statistical parameters representing a measure of the extent to which a higher education institution or a program is performing in a certain quality dimension. They are qualitative and quantitative measures of the output (short-term measures of results) or of the outcome (long-term measures of outcomes and impacts) of a system or of a program. They allow institutions to benchmark their own performances or allow comparison among higher education institutions. Performance indicators work efficiently only when they are used as part of a coherent set of input, process, and output indicators. As higher education institutions are engaged in a variety of activities and target a number of different objectives, it is essential to be able to identify and to implement a large range of performance indicators in order to cover the entire field of activity.
26	Laboratory	Practical experimental class where the students are active and supervised by a staff member and/or assistants.

NO.	TERM	DEFINITION
27	Licensure	The process by which a governmental agency grants official permission to persons meeting predetermined qualifications to engage in a given occupation and/or use of a particular title. Licensure is usually obtained through examination or graduation from an accredited institution. In some countries, a period of practical experience may be required. *Also often called: licensing.*
28	Metrics	Specific statements identifying the performance required to meet specific standards, the performance is measurable, the performance is documentable.
29	Objectives	Short statements that describe the specific knowledge, skills, abilities and/or attitudes expected of graduates three to five years after graduation.
30	Outcomes	Specific knowledge, skills, abilities, and attitudes that students possess at graduation that lead to achievement of the program's objectives. An outcome must be distinguished from an objective. *Also often called: learning outcomes; student outcomes; attributes.*
31	Outcomes Assessment	The process of evaluation and improvement of specific results of a higher education program in order to demonstrate its effectiveness. Assessment may concern the performance of teaching staff, the effectiveness of institutional practices, and/or the functioning of departments or programs (e.g., program reviews, budget reviews, etc.). It is a formative procedure used for self-study, financial retrenchment, program evaluation, and better understanding of the current needs of students.
32	Peer	Increasingly used for "evaluator" or "panel member" in a quality assurance and/or accreditation process, to underline that it is a "peer process."
33	Profile	List of attributes for specific competencies.
34	Program	It is a generic term to represent departments and courses concerned. Programs here are not confined to those provided solely by a department within a faculty as is typically the case with the majority of the universities. A program can consist of multiple departments, while a department can provide multiple programs. It is desirable that the name of a newly established program appropriately represents the program's specialized field of study, clearly indicating its learning or educational objectives, so that it can be precisely recognized by the public.
35	Qualification	A generic term that usually refers an award granted for the successful completion of a study program, in accord to the standard set by an institution of education in a particular filed of study. A qualification is important in terms of what it signifies: competencies and range of knowledge and skills. Sometimes it is equivalent to a license to practice.
36	Professional Qualification	The set of requirements necessary for access to a profession, in particular a regulated profession.

NO.	TERM	DEFINITION
37	Quality	The extent to which a course, the teaching activities and the provider's facilities help students achieve worthwhile learning goals. Quality in higher education is a multi-dimensional, multi-level, and dynamic concept that relates to the contextual settings of an educational model, to the institutional mission and objectives, as well as to specific standards within a given system, institution, program, or discipline.
38	Quality Assurance	An all-embracing term referring to an ongoing, continuous process of evaluating (assessing, monitoring, guaranteeing, maintaining, and improving) the quality of a higher education system, institutions, or programs. As a regulatory mechanism, quality assurance focuses on both accountability and improvement, providing information and judgments (not ranking) through an agreed upon and consistent process and well-established criteria. The scope of quality assurance is determined by the shape and size of the higher education system. *Also often called: quality control; quality management.*
39	Recognition	The provision by which a body or institution (recognizer) considers another body or institution (recognized) appropriate or competent for a certain purpose.
40	Academic Recognition	Approval of courses, qualifications, or diplomas from one (domestic or foreign) higher education institution by another for the purpose of student admission to further studies. Academic recognition can also be sought for an academic career at a second institution and in some cases for access to other employment activities on the labor market (academic recognition for professional purposes).
41	Mutual Recognition	Agreement by two or more institutional bodies to validate each other's degrees, programs, or institutions and/or affirmation by two or more quality assurance or accrediting agencies that the methodology of the agencies are sound and that the procedures are functioning accordingly.
42	Review	The general process of a systematic and critical analysis leading of assessment data to judgments and/or recommendations regarding the quality of a higher education institution or a program. Evaluation is carried out through internal or external procedures. *See also: Accreditation.*
43	Interim Review	A checkpoint during the accreditation cycle to monitor the continuous improvement of the program.
44	Monitoring Review	A periodic evaluation of the accreditation body by its peers on its effectiveness of reviewing the programs and on its fulfillment to meet the requirements of the collective peers.
45	Self-study	The review and evaluation of the quality and effectiveness of an institution's own academic programs, staffing, and structure, based on standards set by an outside quality assurance body, carried out by the institution itself. Self-studies usually are undertaken in preparation for a quality assurance site visit by an outside team of specialists. Results in a self-study report.

NO.	TERM	DEFINITION
46	Site Visit	Site visit is normally part of the accreditation process, which is conducted by a team of peer reviewers who, after examining the institution's or the program's self-study, interview faculty, students, and staff; and examine the structure and effectiveness of the institution and its academic programs.
47	Standards	The level of requirements and conditions that must be met by institutions or programs to be accredited or certified by a quality assurance or accrediting agency. These conditions involve expectations about quality, attainment, effectiveness, financial viability, outcomes, and sustainability.
48	Substantial Equivalent	The recognition by an organization/competent authority that a course unit, a study program or degrees awarded by different institutions of higher education are equivalent. When not considered complete, equivalence is often qualified as substantial equivalence.

ORGANIZATIONAL ACRONYMS

A. Organizations

ACRONYM	ORGANIZATION
AAES	American Association of Engineering Societies
ABEEK	Accreditation Board for Engineering Education of Korea
ABET	ABET, Inc.
ANETL	National Association Engineers of Timor Leste
AICTE	All India Council for Technical Education
ASIIN	German Accreditation Agency for Study Programs in Engineering and Informatics
ASME	The American Society of Mechanical Engineers
BAETE	Board of Accreditation for Engineering and Technical Education, Bangladesh
BEC	Board of Engineers Cambodia
BEM	Board of Engineers Malaysia
BPERB	Bangladesh Professional Engineers Registration Board
CAST	China Association for Science and Technology
CCTT	Canadian Council of Technicians and Technologists
CEAB	Canadian Engineering Accreditation Board of Engineers Canada
CIE	Chinese Institute of Engineer
CIP	The College of Engineers of Peru
COE	Council of Engineers, Thailand
COREN	Council for the Regulation of Engineering in Nigeria
CTAEMC	Chinese Taipei APEC Engineer Monitoring Committee
CTEMC	Chinese Taipei Engineer Mobility Committee
EA	Engineers Australia (formerly known as Institution of Engineers Australia)
EAC	Engineering Accreditation Council, Malaysia
EC	Engineers Canada
ECSA	Engineering Council of South Africa
ECUK	Engineering Council United Kingdom
EI	Engineers Ireland
EIT	The Engineering Institute of Thailand under the King's Patronage
FIE	Institution of Engineers, Fiji
HKIE	The Hong Kong Institution of Engineers
IEET	Institute of Engineering Education Taiwan
IEB	The Institution of Engineers, Bangladesh
IEI (India)	The Institution of Engineers (India)
IEM(My)	The Institution of Engineers, Malaysia
IEM	The Institution of Engineers, Mauritius
IEPNG	The Institution of Engineers, Papua New Guinea
IES	The Institution of Engineers, Singapore
IESL	The Institution of Engineers, Sri Lanka

ACRONYM	ORGANIZATION
IPEJ	Institution of Professional Engineers Japan
IPENZ	Institution of Professional Engineers New Zealand
JABEE	Japan Accreditation Board for Engineering Education
KIVI	Royal Institute of Engineers, Netherlands
KPEA	Korean Professional Engineers Association
LUSEA	Lao Union of Science and Engineering Associations
MES	Myanmar Engineering Society
NBA-AICTE	National Board of Accreditation of All India Council for Technical Education
PATE	Philippine Association for Technical Education
PEC	Pakistan Engineering Council
PII	Persatuan Insinyur Indonesia (The Institution of Engineers Indonesia)
PRB	Professional Regulatory Board (Philippines)
PTC	The Philippine Technological Council
PUJA	Pertubuhan Ukur Jurutera & Arkitek
RAEE	Russian Association of Engineering Education
UNCIEP	United States Council for International Engineering Practice
VUSTA	Vietnam Union of Science and Technology Associations

1.0 THE FEIAP ENGINEERIG EDUCATION ACCREDITATION SYSTEM MODEL FRAMEWORK FOR ENGINEERING TECHNOLOGIST

The FEIAP Engineering Education Guidelines for Engineering Technologist incorporate a system model framework for the accreditation system and are adaptive to the needs of member economies. The system model framework will guide the development of an engineering program accreditation system that focuses on delivery of assured graduate outcomes appropriate to a particular economy at a particular stage in development. The following phased development sequence is projected:

- Engineering Technologist Graduate capabilities appropriate to a period of 'nation building';
- Engineering Technologist Graduate capabilities benchmarked against FEIAP Education Guideline for Engineering Technologist or Sydney Accord under the International Engineering Alliance (IEA) or other equivalent systems.

The FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist will provide guidance on the development of engineering technologist education accreditation system documentation for Engineering Technologist such as a engineering graduate outcomes specification; specific accreditation criteria and associated performance indicators and expectations; self-review submission requirements, accreditation processes and governance.

1.1 Graduate Outcomes Specification

Engineering involves the application of mathematics, natural and physical sciences, and a substantive body of knowledge to the solution of complex problems within broad and often uncertain contexts. Engineering practice needs to be carried out responsibly and ethically, manage risks and be accountable for the entire life cycle of a solution and its effects. Engineering practice must consider economic, public health, safety, legal, social, environment and sustainability factors and engineering practitioners must have the skills and attributes to communicate and work in teams with professionals in wide ranging fields.

Engineering practice skills and knowledge development is a lifelong process, and begins very much with a foundation education qualification. The fundamental purpose of this educational foundation is to build knowledge capabilities, attributes, skills and values which equip the graduate for entry to practice in the career category of engineering technologist. The second stage of formative development occurs as the new graduate works for a period of time, under supervision as a member of the engineering team, and develops the mature competencies for independent practice and registration as an engineering technologist. In parallel with continuing professional development, the foundation education qualification provides the required educational basis for independent practice and registration.

The prime objective of an accreditation system is to evaluate the engineering technologist educational experiences and assessment processes being provided in the foundation

engineering technologist education program, and to pass judgment on the appropriateness and quality of the graduate outcomes that are projected as a consequence of the engineering technologist educational experiences. Outcomes-based accreditation criteria will address wide ranging factors that influence the standard of engineering technologist graduate outcomes, and these will include inputs and processes, as well as direct observation of certain outcomes.

To facilitate such an evaluation it is critical that the engineering technologist education accreditation body is able to provide a benchmark statement of expected graduate outcomes in the particular career category. Such a statement will provide a key reference for both engineering technologist education developers as well as those involved in developing and implementing the accreditation criteria and processes. The benchmark statement of expected engineering technologist graduate outcomes will most certainly comprise a generic component that is applicable to all fields of practice. It may well also provide some discipline specific graduate outcome guidelines which address the underpinning skills and knowledge, specialist technical competence and engineering application abilities within designated fields of practice. This level of detail in the outcomes specification is more likely however to be the responsibility of the engineering technologist educational provider in consultation with stakeholders, as the educational design process unfolds for a particular engineering technologist program within a nominated discipline.

Any foundation engineering technologist education program must be based on a defined graduate outcomes specification that sets out the capability targets for engineering technologist graduates in the particular career category as clear, succinct, assessable statements that cover underpinning knowledge and skills, technical competencies, engineering application capability as well as personal and professional attributes, capabilities, values and attitudes. Such a specification for an individual education program must be demonstrably compliant with the corresponding benchmark statement of engineering technologist graduate outcomes set out by the engineering technologist education accreditation body if the program is to be considered for accreditation within the economies of the engineering technologist education accreditation body. The benchmark statement of graduate outcomes set by the engineering technologist education accreditation body thus drives the processes of educational design and program accreditation.

In order to ensure the substantial equivalence of engineering technologist graduates from engineering technologist programs which arise across the boundaries of accreditation economies, it is essential that the benchmark statements of engineering technologist graduate outcome expectations set up by various engineering technologist education accreditation bodies satisfy a common point of reference or standard. To help facilitate this, the Sydney Accord under the International Engineering Alliance (IEA) has published a Graduate Attributes Exemplar Statement for Engineering Technologist (Appendix 1). This Statements sets out a generic knowledge profile as well as generic attributes which are expected to characterise Engineering Technologist graduates. The Exemplar Statement provides a template or framework for Sydney Accord signatories as they in turn establish localised benchmark statements of graduate outcome expectations of Engineering Technologist. The Exemplar

Statements thus assists in achieving substantial equivalence of graduate outcome expectations across education programs and across accreditation economies. The economy's benchmark statement of outcomes is naturally tuned to the needs of engineering practice within the geographic economy of the Accord signatory, and subsequently provides a framework for education providers as they devise the detailed specification of graduate outcomes for an engineering technologist education program in any particular engineering discipline.

The Graduate Attributes Exemplar Statement of Engineering Technologist published under the IEA is commended as a useful guideline reference for established and emerging accreditation bodies within FEIAP. This Statement provides a generic standard for the knowledge profile and the attributes against which engineering technologist graduates must be able to perform. Each Exemplar Statement is generic in nature and so is universally applicable to all engineering disciplines. Each knowledge and attribute element has a common stem with separate range qualifiers set out to identify the appropriate outcomes for engineering technologist. The range qualifiers differentiate the nature of problem solving and engineering activities in each of these career categories. The International Engineering Alliance has published a companion Exemplar Statement for the mature practitioner, to assist with the achievement of substantial equivalence within the registration/licensing process. This Statement is titled – 'Professional Competency Profile' and mirrors the corresponding 'Graduate Attributes Exemplar'.

The specification of engineering technologist graduate outcomes is thus formalised at three levels as shown in the Figure 1.1.

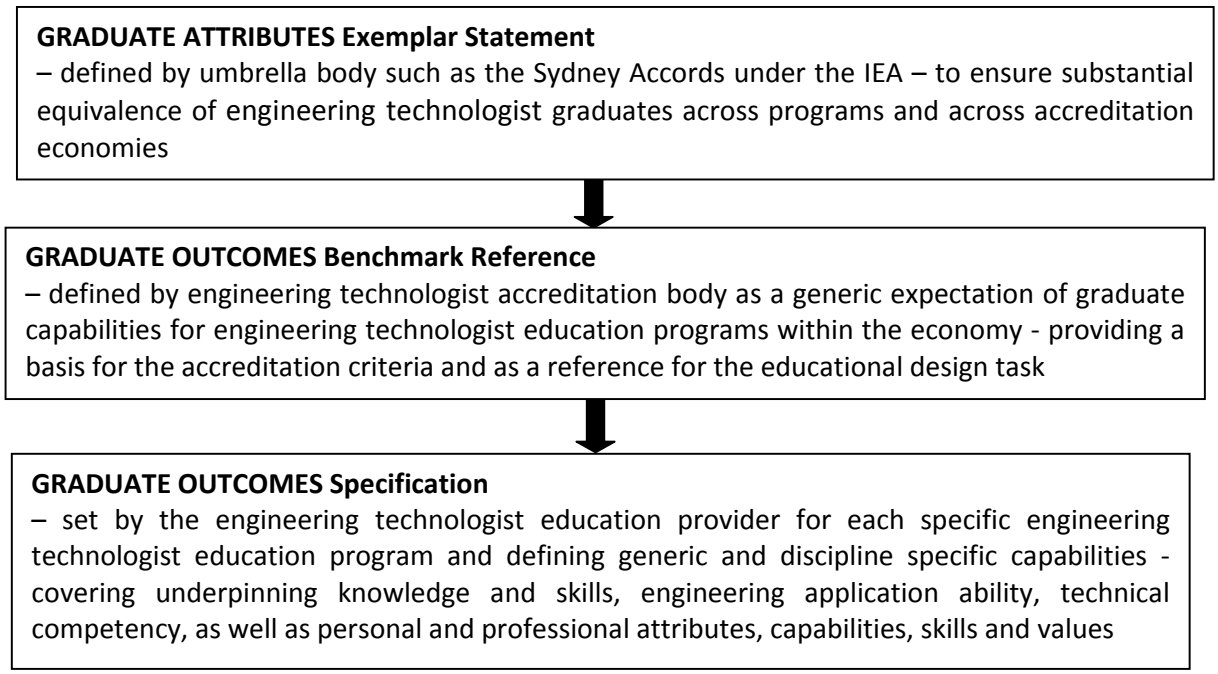

Figure 1.1 Hierarchy of references for ensuring substantial equivalence of graduate outcomes between engineering technologist education programs, within and across accreditation economies.

1.2 Accreditation Criteria

An outcomes-based accreditation system must evaluate the educational experiences and assessment processes set out in the foundation engineering technologist education program, and pass judgment on the appropriateness and quality of the engineering technologist graduate outcomes that are projected as a consequence of the educational experiences.

Such an evaluation needs to be systematic and referenced to clearly defined criteria which address wide ranging factors that influence the standard of engineering technologist graduate outcomes. An outcomes-based evaluation will require a holistic judgment of overall performance against the accreditation criteria.

Many of the elements of the evaluation will be subjective in nature. By definition, the process cannot be distilled down to simple objective measures testing compliance against prescribed requirement thresholds. The task is to consider inputs and processes as well as some outcome observations as collective data for predicting the satisfactory attainment of prescribed graduate outcomes.

A core requirement is for the engineering technologist education provider, to establish the engineering technologist program objectives and to develop a specification of targeted graduate outcomes, covering generic and discipline specific capabilities, knowledge, skills, attributes and values for each program under consideration. The determination of this specification should be undertaken in conjunction with industry stakeholders and should drive the engineering technologist educational design phase, where the learning outcomes from individual activities or program modules systematically aggregate to deliver the targeted graduate outcomes. Individual assessment tasks undertaken throughout the study program need to systematically map against the delivery of the individual elements within the engineering technologist graduate outcomes specification. This then provides a fundamental reference for systematically tracking attainment of outcomes in each individual engineering technologist graduate.

The publication of clear accreditation criteria is an essential foundation for an outcomes-based accreditation system. The criteria must evaluate, rather than prescribe – curriculum, educational methodology, policies, processes and practices. The criteria must be widely understood, be evident from first principles, informed by stakeholders and maintained against international benchmarks. There must be an underlying quality cycle to ensure consistency and fairness, as well as closure of the loop on accreditation processes and practices. Evaluation processes must be documented and auditable.

Engineering technologist educational providers must be required to have in place their own systems for educational development, industry engagement, determining performance measures and for continuing quality improvement.

The accreditation criteria must identify the key factors that will influence the delivery of appropriate engineering technologist graduate outcomes. An engineering technologist graduate

outcomes benchmark reference is the key basis for the criteria and provides a generic template for engineering technologist educational providers to establish the detailed, customised specification of engineering technologist graduate outcomes that underpin each individual program.

Outcomes-based accreditation criteria accommodate innovation and diversity in educational design and in learning and assessment processes, but ensure engineering technologist graduates are equipped with a comprehensive specification of knowledge, capabilities, attributes, skills and values.

Accreditation criteria must under all circumstances embrace:

- the educational environment;
- the program outcomes specification, educational design, structure, content and assessment processes;
- the underpinning quality systems.

FEIAP has published FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist as a resource for member economies embarking on the development of an outcome based accreditation system. This system model will include sample performance indicators and guideline material.

Educational Environment:

- Organisational and management structure – commitment to engineering education;
- Faculty and support staff profile;
- Academic leadership and educational culture; faculty engagement with outcomes-based educational design and delivery;
- Facilities and physical resources;
- Funding model;
- Strategic management of student profile.

Program Design, Structure, Content and Assessment Processes:

- Specification of program objectives and educational outcomes and compatibility with the graduate outcomes benchmark reference template defined within the accreditation system;
- Program title consistent with objectives and designated graduate outcomes;
- Mapping of learning design and assessment processes against delivery of specified graduate outcomes;
- Compliance with any program structural requirements or discipline specific templates;
- Tracking individual student performance against graduate outcomes;
- Exposure of students to professional engineering practice.

Quality Systems:

- Quality Policy ensuring commitment to the Quality Systems;
- Engagement with external constituencies – input to setting reviewing and assessing attainment of graduate outcomes;
- Feedback and stakeholder input to continuous improvement cycle;
- Processes for setting and reviewing objectives and the graduate outcomes specification;
- Approach to educational design and review;
- Approach to assessment and performance evaluation;
- Benchmarking practices;
- Governance processes and structure;
- Student administration systems.

1.3 Accreditation Process

The Engineering Technologist Education Accreditation Body must publish appropriate policies and procedures to provide clear and sufficient information as guidance for engineering technologist programs seeking accreditation. These policies and procedures should include at least the following elements:

1) Documents to be provided by engineering technologist programs
The Engineering Technologist Education Accreditation Body must require engineering technologist programs seeking accreditation to conduct and a full self-review process and submit a report documenting outcomes of the self-review. The self-review process must answer whether the engineering technologist program fulfils requirements set out by the accreditation body. Specifically, the engineering technologist program must provide sufficient evidence, through appropriate and diverse assessment means, to demonstrate that it fulfils the accreditation body's requirement on engineering technologist graduate outcomes. The accreditation team will deliver preliminary findings from reviewing the report and verify their findings through the accreditation visit.

2) Composition of accreditation team
The Engineering Technologist Education accreditation team should consist of at least two persons, preferably more, representing a balance of relevant experience and expertise as well as employment orientation, academics or industry. All members of the accreditation must be sufficiently trained and competent for conducting the review process. Conflict of interest is a critical issue in the accreditation process and must be taken into account in assembling the accreditation team. Each member of the accreditation team must submit a statement indicating partiality prior to his/her nomination.

3) Duration of accreditation visit
The accreditation visit should last at least two days to allow sufficient time for documentation review and the interviews.

4) Structure of the accreditation visit

The accreditation visit should include the following elements:

1. Preliminary meeting of the accreditation team prior to the visit to identify what information is to be obtained during the visit;
2. Meeting with educational institution's administrators;
3. Meeting with head of engineering technologist program;
4. Meeting with academic staff members;
5. Meeting with support staff members;
6. Meeting with students;
7. Meeting with alumni;
8. Meeting with employers/industry/professional engineering organisation's representatives;
9. Visit of facilities;
10. Review of engineering technologist project work, final papers and other documents (with regard to the standards and modes of assessment as well as to the learning outcomes of the students);
11. Feedback of the accreditation team at the end of the visit.

5) Verification and validation of the report by the accreditation agency/commission

The Engineering Technologist Education Accreditation Body must provide a written report to the engineering technologist program at the conclusion of the accreditation process. This report should state clearly the findings of the accreditation team in terms of concerns, weakness, and deficiency of the program. This information will not only support the delivery of accreditation decision but also directions for continuous improvement of the program.

6) Decision on accreditation

The Engineering Technologist Education Accreditation Body must have a fair process to deliver accreditation decisions. The decision-making process needs to be transparent and those who are involved in the process must make informed decisions based on findings of the accreditation teams. The accreditation decision must clearly define the period of validity (the duration of which should not exceed a maximum of six years) and whether it refers to year of entry or year of graduation. After the limited validity of the accreditation has expired, the program must be submitted for re-accreditation. The accreditation decisions must be communicated clearly in written statement to the program.

7) Publication of accreditation decisions

The Engineering Technologist Education Accreditation Body must make the accreditation decisions available to the public, normally through publishing list of accredited programs on its website or on printed materials. Programs fail to received accredited status are normally not published.

8) Procedures of appeals
The Engineering Technologist Education Accreditation Body must have policies and procedures of appeals to ensure the rights of the programs seeking accreditation when error in facts and/or error in procedures happen which causes the programs receive unfavourable decisions. Appropriate conflict of interest procedures must be considered during the appeal process.

1.4 Governance of the Accreditation Body

1) Official Status
The Engineering Technologist Education Accreditation Body must be authorities, agencies or institutions which are representative of the engineering technologist community and which have statutory powers or recognised professional authority for accrediting engineering technologist programs designed to satisfy the academic requirements for admission to practicing status (e.g. licensing, registration or certification) within a defined economy (e.g. country, jurisdiction, geographical region).

2) Mission Statement
The Engineering Technologist Education Accreditation Body must have clear and explicit goals and objectives for its work, contained in a publicly available statement. Specifically, the statement should declare that the accreditation process is a major activity of the accreditation body and that there exists a systematic approach to achieving its goals and objectives.

3) Activities
The Engineering Technologist Education Accreditation Body must undertake the accreditation activities (at program level) on a regular basis. It should declare the career categories associated with programs/qualifications (Engineering Technologist) and disciplines that are recognised (electrical, civil, chemical, mechanical, etc.) as well as geographical bounds of accreditation activities. The accreditation body should also have effective process for the recruitment, selection, training & evaluation of program evaluators.

4) Resources
The Engineering Technologist Education Accreditation Body must have adequate and proportional resources, both human and financial, to enable planning, operation and development of the entire accreditation activities in an effective and efficient manner.

5) Leadership and Management
The Engineering Technologist Education Accreditation Body must have sustainable leadership and management structure to provide confidence and accountability of its accreditation activities. Individuals who hold leadership and management roles must possess credentials and expertise in relevant disciplines. The accreditation body should exercise in accordance with appropriate governance policies during leadership and management changes to enable stability at all times.

6) Independence

The Engineering Technologist Education Accreditation Body must be independent to the extent both that they have autonomous responsibility for its operations and that the accreditation decisions it made cannot be influenced by third parties such as higher education institutions, ministries, legislatures, or other stakeholders.

7) Accountability and Integrity

The Engineering Technologist Education Accreditation Body should have in place procedures for its own accountability and to maintain its integrity. These procedures enable the accreditation body to operate at all times in accordance with high standards of professionalism, ethics, and objectivity. Specifically,

1. The Engineering Technologist Education Accreditation Body has in place, and enforces, a non-conflict-of-interest mechanism that governs the work of its staff and its evaluators;
2. The Engineering Technologist Education Accreditation Body has in place internal quality assurance procedures which include an internal feedback mechanism (i.e. means to collect feedback from its own staff and council/board); an internal reflection mechanism (i.e. means to react to internal and external recommendations for improvement); and an external feedback mechanism (i.e. means to collect feedback from experts and reviewed institutions for future development) in order to inform and underpin its own development and improvement.
3. A mandatory cyclical external review of the agency's activities at least once every five or six years.

2.0 MENTORING SYSTEM

The FEAIP Engineering Education Guidelines for Engineering Technologist provide a structural framework for mentoring services provided under the FEAIP umbrella which will be made available to member economies. Mentoring will follow the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist and lead to the phased development of accreditation systems and graduate outcomes that satisfy nation building phase; and progress, leading to standards of equivalence with FEIAP Engineering Education Guideline for Engineering Technologist requirements or Sydney Accord or other equivalent systems. The mentoring framework will detail mentoring principles, processes for appointment of mentoring teams, reporting mechanisms, expenses, continuation and termination of the mentoring services, and guidelines for mentors.

2.1 Participation

Organisations wishing to participate either as mentees or mentors must be FEIAP members. It will be the decision of the individual organisation as to whether it seeks mentoring support.

Mentoring under the FEIAP umbrella is quite separate to the mentoring services or the processes for seeking membership of other engineering technologist education organisations such as Sydney Accord. Having participated in a FEIAP Engineering Education mentoring relationship will not guarantee successful admission to any other international organisation.

2.2 Appointment and Qualification of Mentor

1. Mentoring is provided by individuals representing the mentor organisations, whereas the mentee is the organisation that receives the mentoring services.
2. Organisations may formally request mentors by lodging a request with the FEIAP Engineering Education Standing Committee.
3. When allocating mentoring organisations the FEIAP Engineering Education Standing Committee must be cognizant of the size of the proposed mentee organisation. Cognizance should also be taken of the geographical closeness of the mentors and mentee.
4. On receipt of a formal request from an organisation for mentoring, the FEIAP Engineering Education Standing Committee will assign at least two member organisations recognized by FEIAP or are signatories to the appropriate engineering technologist educational Accord within the Sydney Accord. Each of these mentoring organisations will in turn nominate an appropriate representative person to serve on the mentoring team.
5. Those persons appointed to fulfil the mentoring process must be knowledgeable, with practical experience in the application of accreditation systems and the engineering technologist education standards in place within their own economy.

6. Mentors act on behalf of the FEIAP Engineering Education Standing Committee, which must be informed of the agreed terms of reference of the mentoring relationship as well as when and what mentoring activities have been undertaken.
7. Mentoring relationships are arranged for a set purpose and for a set period of time. The purpose and time period should be negotiated between the mentee and the mentors and approved by the FEIAP Engineering Education Standing Committee.

2.3 Reporting

1) Mentor to Mentee
Mentors may advise the mentee verbally and in writing. The advice is confidential to the mentors, their representing organisations and the mentee. Any release of the mentoring advice by mentors to third parties, including the FEIAP Engineering Education Standing Committee, must have consent of the mentee.

2) Mentor Report to the FEIAP Engineering Education Standing Committee
Mentors or their representing organisations must report to the FEIAP Engineering Education Standing Committee after the mentoring relationship becomes effective and a mentoring visit took place. Schedules of the subsequent reports are at the mentors' judgment when significant progress or development occurs. Mentor reports shall include the following information:

- the agreed terms or reference of the mentoring relationship;
- the facts of mentor visits to the organisation of the mentee e.g. dates of visits, activities undertaken during the visit;
- a general statement as to the mentee's progress.

The mentee is encouraged to provide feedback on the mentoring experiences. If the mentee wishes, the mentor's report could be submitted to the FEIAP Engineering Education Standing Committee with the mentors' reference.

3) The FEIAP Engineering Education Standing Committee reporting to the FEIAP Executive Committee
The FEIAP Engineering Education Standing Committee will provide a status report to the FEIAP Executive Committee at the Executive Committee meetings about the development and progress of the mentoring services.

2.4 Expenses

Mentors are acting on behalf of the FEIAP Engineering Education Standing Committee, and the mentoring services are not consulting services. Therefore, mentors are strictly refrained from charging the mentee any fee for their services. However, expenses incurred as a result of the mentoring visits, such as airfare (less than five hours economy class, more than five, business class), visa application, accommodation, etc., shall be borne by the mentee.

2.5 Continuation and Termination of the Mentoring Services

Mentors are assigned by the FEIAP Engineering Education Standing Committee for a set period of time. However, if the mentee wishes to continue the services with the same mentors, the services can be continued by the mentors' consent and by informing the FEIAP Engineering Education Standing Committee.

Should a mentee or a mentor like to terminate the mentoring services either by the set time period or earlier, the FEIAP Engineering Education Standing Committee must be informed.

Written statements would be required either to continue or to terminate the mentoring services.

2.6 Guidelines for Mentors

1. Mentors must advise the mentees in accordance with the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist.
2. Mentors must be familiar with and sensitive to the engineering technologist educational system, the culture and environment of higher education, the development of engineering programs and the engineer registration system within the mentee economy. Subsequently, mentors must be sensitive, to the mentee's specific needs, progress plan and decision making regime.
3. Mentors must refrain from being judgmental in providing advice and must act in a professional and objective manner. In providing advice, mentors must observe the sovereignty and statutory requirements of the mentee economy.
4. The contents of mentoring reports must be objective and should provide observations and findings that clearly indicate the mentee's progress towards the phased development of accreditation systems and graduate outcomes that will satisfy nation building phase; or FEIAP Engineering Education Guideline for Engineering Technologist/Sydney Accord education requirements/other equivalent education requirements.
5. Mentors must be clear with their advice either in verbal or written format.
6. Mentors should encourage the mentee to become part of the community by attending engineering accreditation related meetings.
7. Members of the mentoring team are advised to work closely together with clear communication in order to maintain consistency with comment and advice.

2.7 Mentoring Provided by Individual Signatories

Organisations may approach individual economies directly to request support through a private mentoring arrangement. If a member accepts this request then they must inform the FEIAP Engineering Education Standing Committee so that other members are made aware of the private mentoring arrangement. The FEIAP Engineering Education Standing Committee cannot be responsible for the quality of advice and support provided through this private mentoring arrangement.

3.0 EVALUATION OF ACCREDITATION AGENCY

Member economies having developed accreditation systems under the FEIAP Engineering Education Guidelines for Engineering Technologist may apply for assessment and subsequent recognition under the FEIAP Engineering Education framework for Engineering Technologist. Assessment of accreditation criteria, practices and processes will be undertaken by a commissioned team of appropriate member representatives in order to evaluate the integrity and robustness of accreditation processes for assuring graduate outcome standards that meet FEIAP Engineering Educational requirements for Engineering Technologist and are appropriately referenced against the exemplar standards set by the Sydney Accord. A judgment on a particular accreditation agency may lead to a classified recognition of an engineering education program. Two levels of recognition are available and are based on the level of maturity of the applicant agency's accreditation system and processes, as well as the qualifications (degree, advanced diploma, diploma or certificate) of compliance with the criteria that is set out under the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist. The first level of compliance is appropriate to the 'nation-building' phase of the economy. The second level is to comply with the FEIAP Engineering Education Guideline for Engineering Technologist or education requirements of Sydney Accord within the International Engineering Alliance or those of other equivalent systems. This second level of recognition may be accorded as an outcome of a first time evaluation of the applicant agency, or may be an outcome of a second judgment taken after a period of formation, and subsequent to an earlier recognition outcome at the 'nation building' level.

Ultimately such judgment must of course also reveal appropriateness of an accreditation agency to seek recognition under the Sydney Accord. FEIAP Engineering Education Guidelines for Engineering Technologist will provide a structured evaluation framework and will detail submission requirements, processes for appointing evaluation teams, evaluation processes, and decision making. Economies with accreditation systems already recognized under the Sydney Accord would not need to submit for such evaluation when seeking FEIAP membership.

3.1 Application

1. An accreditation agency (subsequently referred to as the Applicant) seeking FEIAP recognition should apply to the FEIAP Engineering Education Standing Committee by submitting a completed Application Form and supporting documentation.
2. The application must be in English.
3. The entire application package (four paper copies and one electronic copy) must be received by the FEIAP Engineering Education Standing Committee no later than 120 days before the commencement of the FEIAP General Assembly at which the application is to be considered.
4. The application must be accompanied by written statements of nomination from two member economies, each nomination containing a declaration that the nominating economy considers that the Applicant's accreditation system meets the FEIAP requirements at one of the two levels of recognition outlined above.

5. A representative of the Applicant must appear in person at the FEIAP General Assembly to formally present the application and answer questions.

3.2 Documentation in Support of Applications

The documentation provided on the Engineering Technologist Education accreditation system should include the following sections:

1) Accreditation Organisation
- Provide the name of the Applicant organisation.
- List the names of the officers of the organisation with brief CVs.
- Describe the affiliation of the organisation with other engineering bodies, government and industry within the economy.

2) Introduction
- Provide general information about the economy and the context of engineering.

3) Education
- Provide a description of primary, secondary, and tertiary education.
- Describe the nature of programs, including admission standards.
- Provide the number and type of engineering institutions and programs, indicating whether the institutions are public or private.

4) Structure of the Engineering Community
- Describe the context of engineering practice and the degree of regulation (i.e. registration versus licensing).
- Describe if there is a protected title and scope of practice.
- Describe any differing categories of engineering practitioners and their academic requirements.
- Describe the relationship of the organisation to licensing, registration or certifying agencies, and the extent to which the organisation can influence the acceptance of accreditation by those agencies.

5) Role of Accreditation
- Describe the role of accreditation in registration.
- Given that accreditation is normally voluntary, describe the degree of participation.

6) Accreditation System
- Describe the development of the accreditation system and its maturity.
- Provide a description of the Accreditation Board including its composition and authority.
- List the objectives of accreditation.

- Provide the criteria for accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
- Provide detailed policies and procedures for conducting the accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of evaluation; organisation of the visit; due process).
- Provide a list of currently accredited programs and a schedule of upcoming evaluations.
- Describe relationships with external engineering organisations, including any agreements.

3.3 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person Review Team to assess the application. Each of the reviewers will represent a different member economy. Members of the Review Team should be completely independent of the Applicant and have the necessary knowledge, experience and expertise to conduct the review. The Applicant may request that reviewers be replaced, if there is a possible conflict of interest.

3.4 Evaluation Process

The evaluation process involves the following:

1. Evaluation of the submitted application and supporting documentation;
2. Observation and evaluation of at least two accreditation visits at cross-sectional institutions of the Applicant;
3. Observation and evaluation of the decision making process of the Applicant, in which the decisions on the observed accreditation visits are to be reached;
4. Submission of an evaluation report to the FEIAP Engineering Education Standing Committee recommending to the member economies whether the Applicant satisfies the FEIAP Engineering Education Guideline for Engineering Technologist requirements for recognition at one of the following levels:
   - ‘nation building’;
   - educational requirements base level education requirements that are expected under FEIAP Engineering Education Guideline for Engineering Technologist/Sydney Accord or other equivalent systems.

3.5 Evaluation Standards

1) Accreditation Standards

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

i. Graduate Outcomes Specification
ii. Education Environment
iii. Program Design, Structure, Content and Assessment Processes
iv. Quality Systems

2) Accreditation Procedures

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

i. Documents to be Provided by Programs,
ii. Composition of Accreditation Team,
iii. Duration of Accreditation Visit,
iv. Structure of the Accreditation Visit,
v. Verification and Validation of the Report by the Accreditation Agency,
vi. Decision on Accreditation,
vii. Publication of Accreditation Decisions,
viii. Procedures of Appeals.

3) Governance of the Accreditation Body

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

i. Official Status
ii. Mission Statement
iii. Activities
iv. Resources
v. Leadership and Management
vi. Independence
vii. Accountability and Integrity
viii. Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the report of the Review Team, and decide whether or not the Applicant should be recognized at either the 'nation building' level; or FEIAP Engineering Education Guideline for Engineering Technologist/Sydney Accord within the International Engineering Alliance/other equivalent education level. The Applicant will be informed of the decision, and receive a final version of the report. The Applicant may ask, in writing, for further information about the decision.

If the decision is not to recognize the Applicant, the Applicant may appeal to the FEIAP Executive Council.

The maximum period of recognition is six years. Before the expiration of this period, a recognized accreditation agency should apply for re-evaluation to demonstrate ongoing compliance with requirements.

3.6 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the report of the Review Team, and decide whether or not the Applicant should be recognized at either the 'nation building' level; or FEIAP Engineering Education Guideline for Engineering Technologist/Sydney Accord/other equivalent systems level. The Applicant will be informed of the decision, and receive a final version of the report. The Applicant may ask, in writing, for further information about the decision.

If the decision is not to recognize the Applicant, the Applicant may appeal to the FEIAP Executive Council.

The maximum period of recognition is six years. Before the expiration of this period, a recognized accreditation agency should apply for re-evaluation to demonstrate ongoing compliance with requirements.

4.0 PERIODIC MONITORING OF ACCREDITATION AGENCY

Once a member economy has attained recognition under the FEIAP Engineering Education system for Engineering Technologist, a periodic peer monitoring process will apply. FEIAP Engineering Education Guidelines for Engineering Technologist will provide an evaluation framework for assessing the on-going compliance of the accreditation system and the continuing standard of graduate outcomes. FEIAP Engineering Education Guidelines for Engineering Technologist will provide the monitoring framework and will detail submission requirements, processes for appointing monitoring review teams, monitoring processes, and decision making. Member economies with engineering education accreditation systems already recognized under the Sydney Accord will be exempted from such periodic monitoring.

4.1 Submission of Documents

If the member economy under review is a non English speaking economy, English translations must be provided for the review team conducting the monitoring process. The documentation should be submitted no less than 60 days prior to the review team's visit and should include the following sections in English:

1. Engineering Technologist Education Accreditation Organisation
    - List the names of the officers of the Engineering Technologist Education Accreditation Organisation with brief CVs.
    - Describe the affiliation of the Engineering Technologist Education Accreditation Organisation with other engineering bodies, government and industry within the economy.

2. Role of Engineering Technologist Education Accreditation
    - Describe the role of Engineering Technologist Education accreditation in registration.
    - Given that Engineering Technologist Education accreditation is normally voluntary, describe the degree of participation.

3. Engineering Technologist Education Accreditation System
    - Provide a description of the Engineering Technologist Education Accreditation Board including its composition and authority.
    - Provide the criteria for Engineering Technologist Education accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
    - Provide detailed policies and procedures for conducting the Engineering Technologist Education accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of accreditation evaluation team; organisation of the visit; due process).
    - Provide a list of currently accredited programs.

4. Changes Made

- Provide information on changes made since last review.
- Provide information to demonstrate evidence of continuous improvement.

4.2 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person review team to conduct the monitoring process. Each of the reviewers represents a different member economy. Members of the review team should be completely independent of the member economy under review and have the necessary knowledge, experience and expertise to conduct the review. The member economy under review may request that reviewers be replaced, if there is a possible conflict of interest.

4.3 Evaluation Process

The review process involves the following:

1. Evaluation of the submitted documents;

2. Monitoring visit should include the following meetings:

- visit to the accreditation office of the member economy under review;
- observation and evaluation of at least two accreditation visits at cross-sectional institutions;
- post-visit team meeting to structure the monitoring report;
- observation and evaluation of the decision making process of the member economy under review, in which the decisions on the observed accreditation visits are to be reached.

3. Submission of an monitoring report to the FEIAP Engineering Education Standing Committee no less than 60 days prior to the next meeting of the FEIAP General Assembly recommending to the member economies whether the member economy under review continue to meet the FEIAP Engineering Education for Engineering Technologist requirements for substantial equivalency. The report shall include:

- an executive summary outlining major system characteristics and citing recommended action with the appropriate action statement;
- an overall introduction to the accreditation system under review and its standards;
- information on accreditation policies, procedures and criteria for the system under review, including a comprehensive analysis of how the accreditation recognition process address marginal, difficult conditional actions;
- A brief description of the educational provider and a listing of the programs observed and accredited results in order set the context for the review;
- indications of any stated or observed substantial deviations to the accreditation criteria, policies or procedures of the system under review and the rationale for the change;

- a statement as to whether the standard of the graduates of accredited programs are substantially equivalent to graduates of other members of the FEIAP;
- any statement of weakness or deficiency; and
- recommended action.

4.4 Evaluation Standards

1) Accreditation Standards
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

- Graduate Outcomes Specification;
- Education Environment;
- Program Design, Structure, Content and Assessment Processes;
- Quality Systems.

2) Accreditation Procedures
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

- Documents to be Provided by Programs;
- Composition of Accreditation Team;
- Duration of Accreditation Visit;
- Structure of the Accreditation Visit;
- Verification and Validation of the Report by the Accreditation Agency;
- Decision on Accreditation;
- Publication of Accreditation Decisions;
- Procedures of Appeals.

3) Governance of the Accreditation Board
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:

- Official Status;
- Mission Statement;
- Activities;
- Resources;
- Leadership and Management;
- Independence;
- Accountability and Integrity.

4) Continuous Improvement
The member economy under review must demonstrate that it continues to take measures to improve its accreditation system, not only for the purpose of fulfilling requirements of the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technologist:, but also for elevating its contribution to the development of engineering technologist education within the economy as well as the FEIAP community.

4.5 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the monitoring report prepared by the review team, and confirm whether the member economy continues to meet the FEIAP Engineering Education for Engineering Technologist requirements for substantial equivalency. The categories of recommendations are:

1. The member economy under review be accepted by FEIAP for a period of six years, based on a determination that its accreditation processes lead to outcomes substantially equivalent to the systems known to the monitoring review team;

2. The member economy under review be accepted by FEIAP for a period of no more than two years subject to the submission of a report which satisfies that adequate steps are being taken to address the specific issues identified by the monitoring review team;

3. Due to serious deficiencies, the member economy is reclassified immediately to conditional status and that urgent and specific assistance be offered by FEIAP.

4.6 Expenses

Expenses incurred as a result of the periodic monitoring review, such as airfare (less than five hours, economy class; more than five, business class), visa application, accommodation, etc., must be borne by the member economy under review.

APPENDIX 1
Graduate Attribute Profiles for Engineering Technologist (International Engineering Alliance)

References to the Knowledge Profile are shown thus: (SK1 to SK4) (Refer to Appendix 2)

Differentiating Characteristic	Graduate Attribute
Engineering Knowledge:	**SA1:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in SK1 to SK4 respectively to defined and applied engineering procedures, processes, systems or methodologies.
Problem Analysis Complexity of analysis	**SA2:** Identify, formulate, research literature and analyse *broadly-defined* engineering problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialisation. (SK1 to SK4)
Design/ development of solutions: Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	**SA3:** Design solutions for *broadly- defined* engineering technology problems and *contribute to* the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (SK5)
Investigation: Breadth and depth of investigation and experimentation	**SA4:** Conduct investigations of *broadly-defined* problems; locate, search and select relevant data from codes, data bases and literature (SK8), design and conduct experiments to provide valid conclusions.
Modern Tool Usage: Level of understanding of the appropriateness of the tool	**SA5:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to *broadly-defined* engineering problems, with an understanding of the limitations. (SK6)
The Engineer and Society: Level of knowledge and responsibility	**SA6:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly defined engineering problems. (SK7)
Environment and Sustainability: Type of solutions.	**SA7:** Understand and evaluate the sustainability and impact of engineering technology work in the solution of broadly defined engineering problems in societal and environmental contexts. (SK7)
Ethics: Understanding and level of practice	**SA8:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7)
Individual and Team work: Role in and diversity of team	**SA9:** Function effectively as an individual, and as a member or leader in diverse teams.

Differentiating Characteristic	Graduate Attribute
Communication: Level of communication according to type of activities performed	**SA10:** Communicate effectively on *broadly-defined* engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
Project Management and Finance: Level of management required for differing types of activity	**SA11:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to manage projects in multidisciplinary environments
Lifelong learning: Preparation for and depth of continuing learning.	**SA12:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

APPENDIX 2
Knowledge Profiles for Engineering Technologist (International Engineering Alliance)

A Sydney Accord programme provides:
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

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FEIAP

ENGINEERING EDUCATION GUIDELINES
(Engineering Technologist)

12 July 2018

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

FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEERING TECHNICIAN

12 July 2018

FEIAP Standing Committee on Engineering Education

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FEIAP
ENGINEERING EDUCATION AND ACCREDITATION GUIDELINES FOR ENGINEERING TECHNICIAN

12 July 2018

FEIAP Engineering Education Working Group

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GLOSSARY OF KEY TERMS FOR ENGINEERING EDUCATION ACCREDITATION

NO.	TERM	DEFINITION
1	Accreditation	A process of self-study by the program and external peer review by appropriately trained and independent teams from both academia and engineering practice for quality assurance, accountability, and quality improvement of an academic program designed to determine whether or not it has met or exceeded the published standards of the accreditor and is achieving its missions and objectives. Success results in an accredited program. Accreditation of an engineering educational program is the primary process used to ensure the suitability of graduates of that program meeting the entry level of the engineering profession.
2	Accreditation Action	A judgment by an accrediting body regarding accreditation for institutions and/or programs. Includes, for example, accredited, denial of accreditation, probation, and warning. etc. *Also often called: decision; status.*
3	Accreditation Body	A body that develops accreditation standards and criteria and conducts peer review to assess whether or not those criteria are met. There are different types of accreditation bodies (e.g., agencies, councils, commissions, etc.), focused on general accreditation, specialized accreditation, professional accreditation, regional accreditation, national accreditation, distance education accreditation, etc. Generally, the accreditation body must make independent decisions without influence of education providers, government and other interest organizations.
4	Accreditation Cycle	Accreditation decisions are time-limited, normally good for five or six years. The duration of validity of the accreditation license is established by the accrediting body, which generally holds the right to suspend and/or to renew the license, upon the satisfactory resolution of any identified issues. *Also often called: duration of accreditation.*
5	Assessment	The process of the systematic gathering, quantifying, qualifying, and using information through a total range of written, oral and practical tests, as well as surveys, projects and portfolios, to judge the instructional effectiveness and the curricular adequacy in light of student learning outcomes. Assessment is necessary in order to validate a formal accreditation decision, but it does not necessarily lead to an accreditation outcome.
6	Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual. *See also: outcomes.*

NO.	TERM	DEFINITION
7	Graduate Attributes	A list of characteristics, namely knowledge, skills, and attitudes, associated with an individual upon graduation from a degree-granting program.
8	Benchmarks	Reference point or standard against which progress or outcomes may be measured and compared. Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programs in a specific term. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.
9	Best Practice	A superior method or an innovative process involving an actual accepted range of reasonable practices resulting in the improved performance of a higher education institution or program, usually recognized as “best” by other peer organizations. A best practice does not necessarily represent an absolute, ultimate example or pattern, the application of which assures the improved performance of a higher education institution or program; rather, it has to do with identifying the best approach to a specific situation, as institutions and programs vary greatly in constituencies and scope.
10	Competence	A concept which embodies the ability of an individual to transfer skills and knowledge to specific situations.
11	Continuous Professional Development	The planned acquisition of knowledge, experience and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout an engineer's professional life.
12	Credit	The "currency" used to measure student workload in terms of the national learning time required to achieve specified learning outcomes. To each course unit a certain amount of credits are assigned. A credit system facilitates the measurement and comparison of learning outcomes achieved in the context of different qualifications, programs of study and learning environments.
13	Criteria	Checkpoints/benchmarks by which the attainment of certain objectives and/or standards can be examined. These involve expectations about quality, effectiveness, financial viability, compliance with national rules and regulations, outcomes, and sustainability. Criteria describe in a certain degree of detail the characteristics of the requirements and conditions to be met [in order to meet a standard] and therefore provide the (quantitative and/or qualitative) basis on which an evaluative conclusion is drawn.
14	Performance Criteria	Yardsticks/checkpoints/benchmarks that are used to judge the attainment of performance standards. As qualities, characteristics, or dimensions of a standard for student performance, they indicate how well students meet expectations of what they should know and be able to do, as expressed by varying gradients of success by (scoring) rubrics or by grades.
15	Curriculum	Comprehensive description of a study program. It includes learning objectives or intended outcomes, contents, assessment procedures.

NO.	TERM	DEFINITION
16	Degree	Qualification awarded to an individual by a recognized higher education institution after successful completion of a prescribed study program. In a credit accumulation system the program is completed through the accumulation of a specified number of credits awarded for the achievement of a specific set of learning outcomes.
17	Design	The process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic science and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The engineering design component of a curriculum must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specification, consideration of alternative solutions, feasibility considerations, production processes, concurrent engineering design, and detailed system description. Further it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics and social impact.
18	Effectiveness	An output of specific review/analyses that measure (the quality of) the achievement of a specific educational goal or the degree to which a higher education institution or a program can be expected to achieve specific requirements. It is different from efficiency, which is measured by the volume of output or input used. As a primary measure of success of a program or of a higher education institution, clear indicators, meaningful information, and evidence best reflecting institutional effectiveness with respect to student learning and academic achievement have to be gathered through various procedures (inspection, observation, site visits, etc.). Engaging in the measurement of educational effectiveness creates a value-added process through quality assurance and accreditation review and contributes to building, within the institution, a culture of evidence.
19	Efficiency	An ability to perform well or to achieve a result without wasted resources, effort, time, or money (using the smallest quantity of resources possible). Educational efficiency can be measured in physical terms (technical efficiency) or in terms of cost (economic efficiency). Greater educational efficiency is achieved when the same amount and standard of educational services are produced at a lower cost, if a more useful educational activity is substituted for a less useful one at the same cost, or if unnecessary educational activities are eliminated. A program or a higher education institution may be efficiently managed, but not effective in achieving its mission, goals, or objectives.

NO.	TERM	DEFINITION
20	Engineer	The term "engineer" refers to a professional dedicated to engineering. "Engineering" is defined as a profession in which engineers make full use of their knowledge in mathematical science, natural science, and science of the artificial, to develop, research, manufacture, operate, and maintain hardware and software of artificial device and systems that contribute to the welfare and security of mankind, through economic exploitation of resources and natural forces, with good perspective of the future impact of such exploitation on society and the environment. A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by four years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Washington Accord or its equivalent.
21	Engineering Technician	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by two years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Dublin Accord or its equivalent.
22	Engineering Technologist	A segment of the engineering profession that requires the individuals to complete an accredited program of study typified by three years or more of post-secondary study. The expected outcomes of the graduates are such as those accepted by the Sydney Accord or its equivalent. Also often called: Incorporated Engineer
23	Ethics	Moral issues and decisions confronting the individuals involved in engineering practice.
24	Indicators	Operational variables referring to specific empirically measurable characteristics of higher education institutions or programs on which evidence can be collected that allows for a determination of whether or not standards are being met. Indicators identify performance trends and signal areas in need for action and/or enable comparison of actual performance with established objectives. *See also: Criteria.*
25	Performance Indicators	A range of statistical parameters representing a measure of the extent to which a higher education institution or a program is performing in a certain quality dimension. They are qualitative and quantitative measures of the output (short-term measures of results) or of the outcome (long-term measures of outcomes and impacts) of a system or of a program. They allow institutions to benchmark their own performances or allow comparison among higher education institutions. Performance indicators work efficiently only when they are used as part of a coherent set of input, process, and output indicators. As higher education institutions are engaged in a variety of activities and target a number of different objectives, it is essential to be able to identify and to implement a large range of performance indicators in order to cover the entire field of activity.
26	Laboratory	Practical experimental class where the students are active and supervised by a staff member and/or assistants.

NO.	TERM	DEFINITION
27	Licensure	The process by which a governmental agency grants official permission to persons meeting predetermined qualifications to engage in a given occupation and/or use of a particular title. Licensure is usually obtained through examination or graduation from an accredited institution. In some countries, a period of practical experience may be required. *Also often called: licensing.*
28	Metrics	Specific statements identifying the performance required to meet specific standards, the performance is measurable, the performance is documentable.
29	Objectives	Short statements that describe the specific knowledge, skills, abilities and/or attitudes expected of graduates three to five years after graduation.
30	Outcomes	Specific knowledge, skills, abilities, and attitudes that students possess at graduation that lead to achievement of the program's objectives. An outcome must be distinguished from an objective. *Also often called: learning outcomes; student outcomes; attributes.*
31	Outcomes Assessment	The process of evaluation and improvement of specific results of a higher education program in order to demonstrate its effectiveness. Assessment may concern the performance of teaching staff, the effectiveness of institutional practices, and/or the functioning of departments or programs (e.g., program reviews, budget reviews, etc.). It is a formative procedure used for self-study, financial retrenchment, program evaluation, and better understanding of the current needs of students.
32	Peer	Increasingly used for "evaluator" or "panel member" in a quality assurance and/or accreditation process, to underline that it is a "peer process."
33	Profile	List of attributes for specific competencies.
34	Program	It is a generic term to represent departments and courses concerned. Programs here are not confined to those provided solely by a department within a faculty as is typically the case with the majority of the universities. A program can consist of multiple departments, while a department can provide multiple programs. It is desirable that the name of a newly established program appropriately represents the program's specialized field of study, clearly indicating its learning or educational objectives, so that it can be precisely recognized by the public.
35	Qualification	A generic term that usually refers an award granted for the successful completion of a study program, in accord to the standard set by an institution of education in a particular filed of study. A qualification is important in terms of what it signifies: competencies and range of knowledge and skills. Sometimes it is equivalent to a license to practice.
36	Professional Qualification	The set of requirements necessary for access to a profession, in particular a regulated profession.

NO.	TERM	DEFINITION
37	Quality	The extent to which a course, the teaching activities and the provider's facilities help students achieve worthwhile learning goals. Quality in higher education is a multi-dimensional, multi-level, and dynamic concept that relates to the contextual settings of an educational model, to the institutional mission and objectives, as well as to specific standards within a given system, institution, program, or discipline.
38	Quality Assurance	An all-embracing term referring to an ongoing, continuous process of evaluating (assessing, monitoring, guaranteeing, maintaining, and improving) the quality of a higher education system, institutions, or programs. As a regulatory mechanism, quality assurance focuses on both accountability and improvement, providing information and judgments (not ranking) through an agreed upon and consistent process and well-established criteria. The scope of quality assurance is determined by the shape and size of the higher education system. *Also often called: quality control; quality management.*
39	Recognition	The provision by which a body or institution (recognizer) considers another body or institution (recognized) appropriate or competent for a certain purpose.
40	Academic Recognition	Approval of courses, qualifications, or diplomas from one (domestic or foreign) higher education institution by another for the purpose of student admission to further studies. Academic recognition can also be sought for an academic career at a second institution and in some cases for access to other employment activities on the labor market (academic recognition for professional purposes).
41	Mutual Recognition	Agreement by two or more institutional bodies to validate each other's degrees, programs, or institutions and/or affirmation by two or more quality assurance or accrediting agencies that the methodology of the agencies are sound and that the procedures are functioning accordingly.
42	Review	The general process of a systematic and critical analysis leading of assessment data to judgments and/or recommendations regarding the quality of a higher education institution or a program. Evaluation is carried out through internal or external procedures. *See also: Accreditation.*
43	Interim Review	A checkpoint during the accreditation cycle to monitor the continuous improvement of the program.
44	Monitoring Review	A periodic evaluation of the accreditation body by its peers on its effectiveness of reviewing the programs and on its fulfillment to meet the requirements of the collective peers.
45	Self-study	The review and evaluation of the quality and effectiveness of an institution's own academic programs, staffing, and structure, based on standards set by an outside quality assurance body, carried out by the institution itself. Self-studies usually are undertaken in preparation for a quality assurance site visit by an outside team of specialists. Results in a self-study report.

NO.	TERM	DEFINITION
46	Site Visit	Site visit is normally part of the accreditation process, which is conducted by a team of peer reviewers who, after examining the institution's or the program's self-study, interview faculty, students, and staff; and examine the structure and effectiveness of the institution and its academic programs.
47	Standards	The level of requirements and conditions that must be met by institutions or programs to be accredited or certified by a quality assurance or accrediting agency. These conditions involve expectations about quality, attainment, effectiveness, financial viability, outcomes, and sustainability.
48	Substantial Equivalent	The recognition by an organization/competent authority that a course unit, a study program or degrees awarded by different institutions of higher education are equivalent. When not considered complete, equivalence is often qualified as substantial equivalence.

ORGANIZATIONAL ACRONYMS

A. Organizations

ACRONYM	ORGANIZATION
AAES	American Association of Engineering Societies
ABEEK	Accreditation Board for Engineering Education of Korea
ABET	ABET, Inc.
ANETL	National Association Engineers of Timor Leste
AICTE	All India Council for Technical Education
ASIIN	German Accreditation Agency for Study Programs in Engineering and Informatics
ASME	The American Society of Mechanical Engineers
BAETE	Board of Accreditation for Engineering and Technical Education, Bangladesh
BEC	Board of Engineers Cambodia
BEM	Board of Engineers Malaysia
BPERB	Bangladesh Professional Engineers Registration Board
CAST	China Association for Science and Technology
CCTT	Canadian Council of Technicians and Technologists
CEAB	Canadian Engineering Accreditation Board of Engineers Canada
CIE	Chinese Institute of Engineer
CIP	The College of Engineers of Peru
COE	Council of Engineers, Thailand
COREN	Council for the Regulation of Engineering in Nigeria
CTAEMC	Chinese Taipei APEC Engineer Monitoring Committee
CTEMC	Chinese Taipei Engineer Mobility Committee
EA	Engineers Australia (formerly known as Institution of Engineers Australia)
EAC	Engineering Accreditation Council, Malaysia
EC	Engineers Canada
ECSA	Engineering Council of South Africa
ECUK	Engineering Council United Kingdom
EI	Engineers Ireland
EIT	The Engineering Institute of Thailand under the King's Patronage
FIE	Institution of Engineers, Fiji
HKIE	The Hong Kong Institution of Engineers
IEET	Institute of Engineering Education Taiwan
IEB	The Institution of Engineers, Bangladesh
IEI (India)	The Institution of Engineers (India)
IEM(My)	The Institution of Engineers, Malaysia
IEM	The Institution of Engineers, Mauritius
IEPNG	The Institution of Engineers, Papua New Guinea
IES	The Institution of Engineers, Singapore
IESL	The Institution of Engineers, Sri Lanka

ACRONYM	ORGANIZATION
IPEJ	Institution of Professional Engineers Japan
IPENZ	Institution of Professional Engineers New Zealand
JABEE	Japan Accreditation Board for Engineering Education
KIVI	Royal Institute of Engineers, Netherlands
KPEA	Korean Professional Engineers Association
LUSEA	Lao Union of Science and Engineering Associations
MES	Myanmar Engineering Society
NBA-AICTE	National Board of Accreditation of All India Council for Technical Education
PATE	Philippine Association for Technical Education
PEC	Pakistan Engineering Council
PII	Persatuan Insinyur Indonesia (The Institution of Engineers Indonesia)
PRB	Professional Regulatory Board (Philippines)
PTC	The Philippine Technological Council
PUJA	Pertubuhan Ukur Jurutera & Arkitek
RAEE	Russian Association of Engineering Education
UNCIEP	United States Council for International Engineering Practice
VUSTA	Vietnam Union of Science and Technology Associations

1.0 THE FEIAP ENGINEERIG EDUCATION ACCREDITATION SYSTEM MODEL FRAMEWORK FOR ENGINEERING TECHNICIAN

The FEIAP Engineering Education Guidelines for Engineering Technician incorporate a model framework for the accreditation system and are adaptive to the needs of member economies. The model framework will guide the development of an engineering program accreditation system that focuses on delivery of assured graduate outcomes appropriate to a particular economy at a particular stage in development. The following phased development sequence is projected:

- Engineering Technician Graduate capabilities appropriate to a period of 'nation building';
- Engineering Technician Graduate capabilities benchmarked against FEIAP Education Guideline for Engineering Technologist or Dublin Accord under the International Engineering Alliance (IEA) or other equivalent systems.

The FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician will provide guidance on the development of engineering technician education accreditation system documentation for Engineering Technician such as an engineering technician graduate outcomes specification; specific accreditation criteria and associated performance indicators and expectations; self-review submission requirements, accreditation processes and governance.

1.1 Graduate Outcomes Specification

Engineering involves the application of mathematics, natural and physical sciences, and a substantive body of knowledge to the solution of complex problems within broad and often uncertain contexts. Engineering practice needs to be carried out responsibly and ethically, manage risks and be accountable for the entire life cycle of a solution and its effects. Engineering practice must consider economic, public health, safety, legal, social, environment and sustainability factors and engineering practitioners must have the skills and attributes to communicate and work in teams with professionals in wide ranging fields.

Engineering practice skills and knowledge development is a lifelong process, and begins very much with a foundation education qualification. The fundamental purpose of this educational foundation is to build knowledge capabilities, attributes, skills and values which equip the graduate for entry to practice in the career category of engineering technician. The second stage of formative development occurs as the new graduate works for a period of time, under supervision as a member of the engineering team, and develops the mature competencies for independent practice and registration as an engineering technician. In parallel with continuing professional development, the foundation education qualification provides the required educational basis for independent practice and registration.

The prime objective of an accreditation system is to evaluate the engineering technician educational experiences and assessment processes being provided in the foundation engineering technician education program, and to pass judgment on the appropriateness and

quality of the graduate outcomes that are projected as a consequence of the engineering technician educational experiences. Outcomes-based accreditation criteria will address wide ranging factors that influence the standard of engineering technician graduate outcomes, and these will include inputs and processes, as well as direct observation of certain outcomes.

To facilitate such an evaluation it is critical that the engineering technician education accreditation body is able to provide a benchmark statement of expected graduate outcomes in the particular career category. Such a statement will provide a key reference for both engineering technician education developers as well as those involved in developing and implementing the accreditation criteria and processes. The benchmark statement of expected engineering technician graduate outcomes will most certainly comprise a generic component that is applicable to all fields of practice. It may well also provide some discipline specific graduate outcome guidelines which address the underpinning skills and knowledge, specialist technical competence and engineering application abilities within designated fields of practice. This level of detail in the outcomes specification is more likely however to be the responsibility of the engineering technician educational provider in consultation with stakeholders, as the educational design process unfolds for a particular engineering technician program within a nominated discipline.

Any foundation engineering technician education program must be based on a defined graduate outcomes specification that sets out the capability targets for engineering technician graduates in the particular career category as clear, succinct, assessable statements that cover underpinning knowledge and skills, technical competencies, engineering application capability as well as personal and professional attributes, capabilities, values and attitudes. Such a specification for an individual education program must be demonstrably compliant with the corresponding benchmark statement of engineering technician graduate outcomes set out by the engineering technician education accreditation body if the program is to be considered for accreditation within the economies of the engineering technician education accreditation body. The benchmark statement of graduate outcomes set by the engineering technician education accreditation body thus drives the processes of educational design and program accreditation.

In order to ensure the substantial equivalence of engineering technician graduates from engineering technician programs which arise across the boundaries of accreditation economies, it is essential that the benchmark statements of engineering technician graduate outcome expectations set up by various engineering technician education accreditation bodies satisfy a common point of reference or standard. To help facilitate this, the Dublin Accord under the International Engineering Alliance (IEA) has published a Graduate Attributes Exemplar Statement for Engineering Technician (Appendix 1). This Statement sets out a generic knowledge profile as well as generic attributes which are expected to characterise Engineering Technician graduates. The Exemplar Statement provides a template or framework for Dublin Accord signatories as they in turn establish localised benchmark statements of graduate outcome expectations of Engineering Technician. The Exemplar Statement thus assists in achieving substantial equivalence of graduate outcome expectations across education programs and across accreditation economies. The economy's benchmark statement of

outcomes is naturally tuned to the needs of engineering practice within the geographic economy of the Accord signatory, and subsequently provides a framework for education providers as they devise the detailed specification of graduate outcomes for an engineering technician education program in any particular engineering discipline.

The Graduate Attributes Exemplar Statement of Engineering Technician published under the IEA is commended as a useful guideline reference for established and emerging accreditation bodies within FEIAP. This Statement provides a generic standard for the knowledge profile and the attributes against which engineering technician graduates must be able to perform. Each Exemplar Statement is generic in nature and so is universally applicable to all engineering disciplines. Each knowledge and attribute element has a common stem with separate range qualifiers set out to identify the appropriate outcomes for engineering technician. The International Engineering Alliance has published a companion Exemplar Statement for the mature practitioner in each career category, to assist with the achievement of substantial equivalence within the registration/licensing process. This Statement is titled – 'Professional Competency Profile' and mirrors the corresponding 'Graduate Attributes Exemplar' in the particular career category.

The specification of engineering Technician graduate outcomes is thus formalised at three levels as shown in the Figure 1.1.

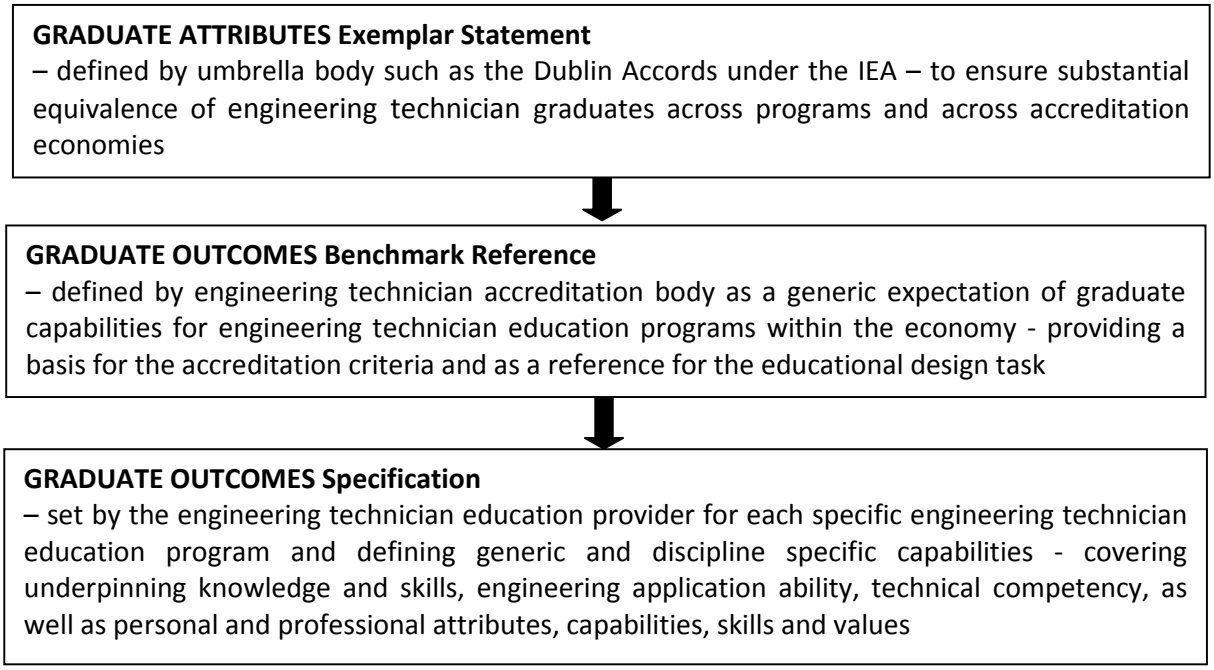

Figure 1.1 Hierarchy of references for ensuring substantial equivalence of graduate outcomes between engineering technician education programs, within and across accreditation economies.

1.2 Accreditation Criteria

An outcomes-based accreditation system must evaluate the educational experiences and assessment processes set out in the foundation engineering technician education program, and pass judgment on the appropriateness and quality of the engineering technician graduate outcomes that are projected as a consequence of the educational experiences.

Such an evaluation needs to be systematic and referenced to clearly defined criteria which address wide ranging factors that influence the standard of engineering technician graduate outcomes. An outcomes-based evaluation will require a holistic judgment of overall performance against the accreditation criteria.

Many of the elements of the evaluation will be subjective in nature. By definition, the process cannot be distilled down to simple objective measures testing compliance against prescribed requirement thresholds. The task is to consider inputs and processes as well as some outcome observations as collective data for predicting the satisfactory attainment of prescribed graduate outcomes.

A core requirement is for the engineering technician education provider, to establish the engineering technician program objectives and to develop a specification of targeted graduate outcomes, covering generic and discipline specific capabilities, knowledge, skills, attributes and values for each program under consideration. The determination of this specification should be undertaken in conjunction with industry stakeholders and should drive the engineering technician educational design phase, where the learning outcomes from individual activities or program modules systematically aggregate to deliver the targeted graduate outcomes. Individual assessment tasks undertaken throughout the study program need to systematically map against the delivery of the individual elements within the engineering technician graduate outcomes specification. This then provides a fundamental reference for systematically tracking attainment of outcomes in each individual engineering technician graduate.

The publication of clear accreditation criteria is an essential foundation for an outcomes-based accreditation system. The criteria must evaluate, rather than prescribe – curriculum, educational methodology, policies, processes and practices. The criteria must be widely understood, be evident from first principles, informed by stakeholders and maintained against international benchmarks. There must be an underlying quality cycle to ensure consistency and fairness, as well as closure of the loop on accreditation processes and practices. Evaluation processes must be documented and auditable.

Engineering technician educational providers must be required to have in place their own systems for educational development, industry engagement, determining performance measures and for continuing quality improvement.

The accreditation criteria must identify the key factors that will influence the delivery of appropriate engineering technician graduate outcomes. An engineering technician graduate

outcomes benchmark reference is the key basis for the criteria and provides a generic template for engineering technician educational providers to establish the detailed, customised specification of engineering technician graduate outcomes that underpin each individual program.

Outcomes-based accreditation criteria accommodate innovation and diversity in educational design and in learning and assessment processes, but ensure engineering technician graduates are equipped with a comprehensive specification of knowledge, capabilities, attributes, skills and values.

Accreditation criteria must under all circumstances embrace:

- the educational environment;
- the program outcomes specification, educational design, structure, content and assessment processes;
- the underpinning quality systems.

FEIAP has published FEIAP Engineering Education Guideline for Engineering Technician as a resource for member economies embarking on the development of an outcome based accreditation system. This model will include sample performance indicators and guideline material.

Educational Environment:

- Organisational and management structure – commitment to engineering education;
- Faculty and support staff profile;
- Academic leadership and educational culture; faculty engagement with outcomes-based educational design and delivery;
- Facilities and physical resources;
- Funding model;
- Strategic management of student profile.

Program Design, Structure, Content and Assessment Processes:

- Specification of program objectives and educational outcomes and compatibility with the graduate outcomes benchmark reference template defined within the accreditation system;
- Program title consistent with objectives and designated graduate outcomes;
- Mapping of learning design and assessment processes against delivery of specified graduate outcomes;
- Compliance with any program structural requirements or discipline specific templates;
- Tracking individual student performance against graduate outcomes;
- Exposure of students to professional engineering practice.

Quality Systems:

- Quality Policy ensuring commitment to the Quality Systems;
- Engagement with external constituencies – input to setting reviewing and assessing attainment of graduate outcomes;
- Feedback and stakeholder input to continuous improvement cycle;
- Processes for setting and reviewing objectives and the graduate outcomes specification;
- Approach to educational design and review;
- Approach to assessment and performance evaluation;
- Benchmarking practices;
- Governance processes and structure;
- Student administration systems.

1.3 Accreditation Process

The Engineering Technician Education Accreditation Body must publish appropriate policies and procedures to provide clear and sufficient information as guidance for engineering technician programs seeking accreditation. These policies and procedures should include at least the following elements:

1) Documents to be provided by engineering technician programs

The Engineering Technician Education Accreditation Body must require engineering technician programs seeking accreditation to conduct and a full self-review process and submit a report documenting outcomes of the self-review. The self-review process must answer whether the engineering technician program fulfils requirements set out by the accreditation body. Specifically, the engineering technician program must provide sufficient evidence, through appropriate and diverse assessment means, to demonstrate that it fulfils the accreditation body's requirement on engineering technician graduate outcomes. The accreditation team will deliver preliminary findings from reviewing the report and verify their findings through the accreditation visit.

2) Composition of accreditation team

The Engineering Technician Education accreditation team should consist of at least two persons, preferably more, representing a balance of relevant experience and expertise as well as employment orientation, academics or industry. All members of the accreditation must be sufficiently trained and competent for conducting the review process. Conflict of interest is a critical issue in the accreditation process and must be taken into account in assembling the accreditation team. Each member of the accreditation team must submit a statement indicating partiality prior to his/her nomination.

3) Duration of accreditation visit

The accreditation visit should last at least two days to allow sufficient time for documentation review and the interviews.

4) Structure of the accreditation visit

The accreditation visit should include the following elements:

1. Preliminary meeting of the accreditation team prior to the visit to identify what information is to be obtained during the visit;
2. Meeting with educational institution's administrators;
3. Meeting with head of engineering technician program;
4. Meeting with academic staff members;
5. Meeting with support staff members;
6. Meeting with students;
7. Meeting with alumni;
8. Meeting with employers/industry/professional engineering organisation's representatives;
9. Visit of facilities;
10. Review of engineering project work, final papers and other documents (with regard to the standards and modes of assessment as well as to the learning outcomes of the students);
11. Feedback of the accreditation team at the end of the visit.

5) Verification and validation of the report by the accreditation agency/commission

The Engineering Technician Education Accreditation Body must provide a written report to the engineering technician program at the conclusion of the accreditation process. This report should state clearly the findings of the accreditation team in terms of concerns, weakness, and deficiency of the program. This information will not only support the delivery of accreditation decision but also directions for continuous improvement of the program.

6) Decision on accreditation

The Engineering Technician Education Accreditation Body must have a fair process to deliver accreditation decisions. The decision-making process needs to be transparent and those who are involved in the process must make informed decisions based on findings of the accreditation teams. The accreditation decision must clearly define the period of validity (the duration of which should not exceed a maximum of six years) and whether it refers to year of entry or year of graduation. After the limited validity of the accreditation has expired, the program must be submitted for re-accreditation. The accreditation decisions must be communicated clearly in written statement to the program.

7) Publication of accreditation decisions

The Engineering Technician Education Accreditation Body must make the accreditation decisions available to the public, normally through publishing list of accredited programs on its website or on printed materials. Programs fail to received accredited status are normally not published.

8) Procedures of appeals
The Engineering Technician Education Accreditation Body must have policies and procedures of appeals to ensure the rights of the programs seeking accreditation when error in facts and/or error in procedures happen which causes the programs receive unfavourable decisions. Appropriate conflict of interest procedures must be considered during the appeal process.

1.4 Governance of the Accreditation Body

1) Official Status
The Engineering Technician Education Accreditation Body must be authorities, agencies or institutions which are representative of the engineering technician community and which have statutory powers or recognised professional authority for accrediting engineering technician programs designed to satisfy the academic requirements for admission to practicing status (e.g. licensing, registration or certification) within a defined economy (e.g. country, jurisdiction, geographical region).

2) Mission Statement
The Engineering Technician Education Accreditation Body must have clear and explicit goals and objectives for its work, contained in a publicly available statement. Specifically, the statement should declare that the accreditation process is a major activity of the accreditation body and that there exists a systematic approach to achieving its goals and objectives.

3) Activities
The Engineering Technician Education Accreditation Body must undertake the accreditation activities (at program level) on a regular basis. It should declare the career categories associated with programs/qualifications (Engineering Technician) and disciplines that are recognised (electrical, civil, chemical, mechanical, etc.) as well as geographical bounds of accreditation activities. The accreditation body should also have effective process for the recruitment, selection, training & evaluation of program evaluators.

4) Resources
The Engineering Technician Education Accreditation Body must have adequate and proportional resources, both human and financial, to enable planning, operation and development of the entire accreditation activities in an effective and efficient manner.

5) Leadership and Management
The Engineering Technician Education Accreditation Body must have sustainable leadership and management structure to provide confidence and accountability of its accreditation activities. Individuals who hold leadership and management roles must possess credentials and expertise in relevant disciplines. The accreditation body should exercise in accordance with appropriate governance policies during leadership and management changes to enable stability at all times.

6) Independence

The Engineering Technician Education Accreditation Body must be independent to the extent both that they have autonomous responsibility for its operations and that the accreditation decisions it made cannot be influenced by third parties such as higher education institutions, ministries, legislatures, or other stakeholders.

7) Accountability and Integrity

The Engineering Technician Education Accreditation Body should have in place procedures for its own accountability and to maintain its integrity. These procedures enable the accreditation body to operate at all times in accordance with high standards of professionalism, ethics, and objectivity. Specifically,

1. The Engineering Technician Education Accreditation Body has in place, and enforces, a non-conflict-of-interest mechanism that governs the work of its staff and its evaluators;
2. The Engineering Technician Education Accreditation Body has in place internal quality assurance procedures which include an internal feedback mechanism (i.e. means to collect feedback from its own staff and council/board); an internal reflection mechanism (i.e. means to react to internal and external recommendations for improvement); and an external feedback mechanism (i.e. means to collect feedback from experts and reviewed institutions for future development) in order to inform and underpin its own development and improvement.
3. A mandatory cyclical external review of the agency's activities at least once every five or six years.

2.0 MENTORING SYSTEM

The FEAIP Engineering Education Guidelines for Engineering Technician provide a structural framework for mentoring services provided under the FEAIP umbrella which will be made available to member economies. Mentoring will follow the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician and lead to the phased development of accreditation systems and graduate outcomes that satisfy nation building phase; and progress, leading to standards of equivalence with FEIAP Engineering Education Guideline for Engineering Technician requirements or Dublin Accord or other equivalent systems requirements. The mentoring framework will detail mentoring principles, processes for appointment of mentoring teams, reporting mechanisms, expenses, continuation and termination of the mentoring services, and guidelines for mentors.

2.1 Participation

Organisations wishing to participate either as mentees or mentors must be FEIAP members. It will be the decision of the individual organisation as to whether it seeks mentoring support.

Mentoring under the FEIAP umbrella is quite separate to the mentoring services or the processes for seeking membership of other engineering technician education organisations such as Dublin Accord. Having participated in a FEIAP Engineering Education mentoring relationship will not guarantee successful admission to any other international organisation.

2.2 Appointment and Qualification of Mentor

1. Mentoring is provided by individuals representing the mentor organisations, whereas the mentee is the organisation that receives the mentoring services.
2. Organisations may formally request mentors by lodging a request with the FEIAP Engineering Education Standing Committee.
3. When allocating mentoring organisations the FEIAP Engineering Education Standing Committee must be cognizant of the size of the proposed mentee organisation. Cognizance should also be taken of the geographical closeness of the mentors and mentee.
4. On receipt of a formal request from an organisation for mentoring, the FEIAP Engineering Education Standing Committee will assign at least two member organisations recognized by FEIAP or are signatories to the appropriate engineering technician educational Accord within the Dublin Accord. Each of these mentoring organisations will in turn nominate an appropriate representative person to serve on the mentoring team.
5. Those persons appointed to fulfil the mentoring process must be knowledgeable, with practical experience in the application of accreditation systems and the engineering technician education standards in place within their own economy.

6. Mentors act on behalf of the FEIAP Engineering Education Standing Committee, which must be informed of the agreed terms of reference of the mentoring relationship as well as when and what mentoring activities have been undertaken.
7. Mentoring relationships are arranged for a set purpose and for a set period of time. The purpose and time period should be negotiated between the mentee and the mentors and approved by the FEIAP Engineering Education Standing Committee.

2.3 Reporting

1) Mentor to Mentee
Mentors may advise the mentee verbally and in writing. The advice is confidential to the mentors, their representing organisations and the mentee. Any release of the mentoring advice by mentors to third parties, including the FEIAP Engineering Education Standing Committee, must have consent of the mentee.

2) Mentor Report to the FEIAP Engineering Education Standing Committee
Mentors or their representing organisations must report to the FEIAP Engineering Education Standing Committee after the mentoring relationship becomes effective and a mentoring visit took place. Schedules of the subsequent reports are at the mentors' judgment when significant progress or development occurs. Mentor reports shall include the following information:

- the agreed terms or reference of the mentoring relationship;
- the facts of mentor visits to the organisation of the mentee e.g. dates of visits, activities undertaken during the visit;
- a general statement as to the mentee's progress.

The mentee is encouraged to provide feedback on the mentoring experiences. If the mentee wishes, the mentor's report could be submitted to the FEIAP Engineering Education Standing Committee with the mentors' reference.

3) The FEIAP Engineering Education Standing Committee reporting to the FEIAP Executive Committee
The FEIAP Engineering Education Standing Committee will provide a status report to the FEIAP Executive Committee at the Executive Committee meetings about the development and progress of the mentoring services.

2.4 Expenses

Mentors are acting on behalf of the FEIAP Engineering Education Standing Committee, and the mentoring services are not consulting services. Therefore, mentors are strictly refrained from charging the mentee any fee for their services. However, expenses incurred as a result of the mentoring visits, such as airfare (less than five hours economy class, more than five, business class), visa application, accommodation, etc., shall be borne by the mentee.

2.5 Continuation and Termination of the Mentoring Services

Mentors are assigned by the FEIAP Engineering Education Standing Committee for a set period of time. However, if the mentee wishes to continue the services with the same mentors, the services can be continued by the mentors' consent and by informing the FEIAP Engineering Education Standing Committee.

Should a mentee or a mentor like to terminate the mentoring services either by the set time period or earlier, the FEIAP Engineering Education Standing Committee must be informed.

Written statements would be required either to continue or to terminate the mentoring services.

2.6 Guidelines for Mentors

1. Mentors must advise the mentees in accordance with the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician.
2. Mentors must be familiar with and sensitive to the engineering technician educational system, the culture and environment of higher education, the development of engineering programs and the engineer registration system within the mentee economy. Subsequently, mentors must be sensitive, to the mentee's specific needs, progress plan and decision making regime.
3. Mentors must refrain from being judgmental in providing advice and must act in a professional and objective manner. In providing advice, mentors must observe the sovereignty and statutory requirements of the mentee economy.
4. The contents of mentoring reports must be objective and should provide observations and findings that clearly indicate the mentee's progress towards the phased development of accreditation systems and graduate outcomes that will satisfy nation building phase; or FEIAP Engineering Education Guideline for Engineering Technician/Dublin Accord/other equivalent system education requirements.
5. Mentors must be clear with their advice either in verbal or written format.
6. Mentors should encourage the mentee to become part of the community by attending engineering accreditation related meetings.
7. Members of the mentoring team are advised to work closely together with clear communication in order to maintain consistency with comment and advice.

2.7 Mentoring Provided by Individual Signatories

Organisations may approach individual economies directly to request support through a private mentoring arrangement. If a member accepts this request then they must inform the FEIAP Engineering Education Standing Committee so that other members are made aware of the private mentoring arrangement. The FEIAP Engineering Education Standing Committee cannot be responsible for the quality of advice and support provided through this private mentoring arrangement.

3.0 EVALUATION OF ACCREDITATION AGENCY

Member economies having developed accreditation systems under the FEIAP Engineering Education Guidelines for Engineering Technician may apply for assessment and subsequent recognition under the FEIAP Engineering Education framework for Engineering Technician. Assessment of accreditation criteria, practices and processes will be undertaken by a commissioned team of appropriate member representatives in order to evaluate the integrity and robustness of accreditation processes for assuring graduate outcome standards that meet FEIAP Engineering Educational requirements for Engineering Technician and are appropriately referenced against the exemplar standards set by the Dublin Accord. A judgment on a particular accreditation agency may lead to a classified recognition of an engineering education program. Two levels of recognition are available and are based on the level of maturity of the applicant agency's accreditation system and processes, as well as the qualifications (degree, advanced diploma, diploma or certificate) of compliance with the criteria that is set out under the FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician. The first level of compliance is appropriate to the 'nation-building' phase of the economy. The second level is to comply with the FEIAP Engineering Education Guideline for Engineering Technician/Dublin Accord/other equivalent system requirements. This second level of recognition may be accorded as an outcome of a first time evaluation of the applicant agency, or may be an outcome of a second judgment taken after a period of formation, and subsequent to an earlier recognition outcome at the 'nation building' level.

Ultimately such judgment must of course also reveal appropriateness of an accreditation agency to seek recognition under the Dublin Accord. FEIAP Engineering Education Guidelines for Engineering Technician will provide a structured evaluation framework and will detail submission requirements, processes for appointing evaluation teams, evaluation processes, and decision making. Economies with accreditation systems already recognized under the Dublin Accord would not need to submit for such evaluation when seeking FEIAP membership.

3.1 Application

1. An accreditation agency (subsequently referred to as the Applicant) seeking FEIAP recognition should apply to the FEIAP Engineering Education Standing Committee by submitting a completed Application Form and supporting documentation.
2. The application must be in English.
3. The entire application package (four paper copies and one electronic copy) must be received by the FEIAP Engineering Education Standing Committee no later than 120 days before the commencement of the FEIAP General Assembly at which the application is to be considered.
4. The application must be accompanied by written statements of nomination from two member economies, each nomination containing a declaration that the nominating economy considers that the Applicant's accreditation system meets the FEIAP requirements at one of the two levels of recognition outlined above.

5. A representative of the Applicant must appear in person at the FEIAP General Assembly to formally present the application and answer questions.

3.2 Documentation in Support of Applications

The documentation provided on the Engineering Technician Education accreditation system should include the following sections:

1) Accreditation Organisation
- Provide the name of the Applicant organisation.
- List the names of the officers of the organisation with brief CVs.
- Describe the affiliation of the organisation with other engineering bodies, government and industry within the economy.

2) Introduction
- Provide general information about the economy and the context of engineering.

3) Education
- Provide a description of primary, secondary, and tertiary education.
- Describe the nature of programs, including admission standards.
- Provide the number and type of engineering institutions and programs, indicating whether the institutions are public or private.

4) Structure of the Engineering Community
- Describe the context of engineering practice and the degree of regulation (i.e. registration versus licensing).
- Describe if there is a protected title and scope of practice.
- Describe any differing categories of engineering practitioners and their academic requirements.
- Describe the relationship of the organisation to licensing, registration or certifying agencies, and the extent to which the organisation can influence the acceptance of accreditation by those agencies.

5) Role of Accreditation
- Describe the role of accreditation in registration.
- Given that accreditation is normally voluntary, describe the degree of participation.

6) Accreditation System
- Describe the development of the accreditation system and its maturity.
- Provide a description of the Accreditation Board including its composition and authority.
- List the objectives of accreditation.

- Provide the criteria for accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
- Provide detailed policies and procedures for conducting the accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of evaluation; organisation of the visit; due process).
- Provide a list of currently accredited programs and a schedule of upcoming evaluations.
- Describe relationships with external engineering organisations, including any agreements.

3.3 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person Review Team to assess the application. Each of the reviewers will represent a different member economy. Members of the Review Team should be completely independent of the Applicant and have the necessary knowledge, experience and expertise to conduct the review. The Applicant may request that reviewers be replaced, if there is a possible conflict of interest.

3.4 Evaluation Process

The evaluation process involves the following:

1. Evaluation of the submitted application and supporting documentation;
2. Observation and evaluation of at least two accreditation visits at cross-sectional institutions of the Applicant;
3. Observation and evaluation of the decision making process of the Applicant, in which the decisions on the observed accreditation visits are to be reached;
4. Submission of an evaluation report to the FEIAP Engineering Education Standing Committee recommending to the member economies whether the Applicant satisfies the FEIAP Engineering Education Guideline for Engineering Technician requirements for recognition at one of the following levels:
   - 'nation building';
   - educational requirements base level education requirements that are expected under FEIAP Engineering Education Guideline for Engineering Technician/Dublin Accord or other equivalent systems.

3.5 Evaluation Standards

1) Accreditation Standards

The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician:

i. Graduate Outcomes Specification
ii. Education Environment

iii. Program Design, Structure, Content and Assessment Processes
iv. Quality Systems

2) Accreditation Procedures
The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician:

i. Documents to be Provided by Programs,
ii. Composition of Accreditation Team,
iii. Duration of Accreditation Visit,
iv. Structure of the Accreditation Visit,
v. Verification and Validation of the Report by the Accreditation Agency,
vi. Decision on Accreditation,
vii. Publication of Accreditation Decisions,
viii. Procedures of Appeals.

3) Governance of the Accreditation Body
The Applicant must demonstrate an appropriate standard of compliance with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework for Engineering Technician:

i. Official Status
ii. Mission Statement
iii. Activities
iv. Resources
v. Leadership and Management
vi. Independence
vii. Accountability and Integrity
viii. Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the report of the Review Team, and decide whether or not the Applicant should be recognized at either the 'nation building' level; or FEIAP Engineering Education Guideline for Engineering Technician/Dublin Accord Accord within the International Engineering Alliance/ other equivalent education level. The Applicant will be informed of the decision, and receive a final version of the report. The Applicant may ask, in writing, for further information about the decision.

If the decision is not to recognize the Applicant, the Applicant may appeal to the FEIAP Executive Council.

The maximum period of recognition is six years. Before the expiration of this period, a recognized accreditation agency should apply for re-evaluation to demonstrate ongoing compliance with requirements.

3.6 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the report of the Review Team, and decide whether or not the Applicant should be recognized at either the 'nation building' level; or FEIAP Engineering Education Guideline for Engineering Technician/Dublin Accord/other equivalent system level. The Applicant will be informed of the decision, and receive a final version of the report. The Applicant may ask, in writing, for further information about the decision.

If the decision is not to recognize the Applicant, the Applicant may appeal to the FEIAP Executive Council.

The maximum period of recognition is six years. Before the expiration of this period, a recognized accreditation agency should apply for re-evaluation to demonstrate ongoing compliance with requirements.

4.0 PERIODIC MONITORING OF ACCREDITATION AGENCY

Once a member economy has attained recognition under the FEIAP Engineering Education system for Engineering Technician, a periodic peer monitoring process will apply. FEIAP Engineering Education Guidelines for Engineering Technician will provide an evaluation framework for assessing the on-going compliance of the accreditation system and the continuing standard of graduate outcomes. FEIAP Engineering Education Guidelines for Engineering Technician will provide the monitoring framework and will detail submission requirements, processes for appointing monitoring review teams, monitoring processes, and decision making. Member economies with engineering education accreditation systems already recognized under the Dublin Accord will be exempted from such periodic monitoring.

4.1 Submission of Documents

If the member economy under review is a non English speaking economy, English translations must be provided for the review team conducting the monitoring process. The documentation should be submitted no less than 60 days prior to the review team's visit and should include the following sections in English:

1. Engineering Technician Education Accreditation Organisation
    - List the names of the officers of the Engineering Technician Education Accreditation Organisation with brief CVs.
    - Describe the affiliation of the Engineering Technician Education Accreditation Organisation with other engineering bodies, government and industry within the economy.

2. Role of Engineering Technician Education Accreditation
    - Describe the role of Engineering Technician Education accreditation in registration.
    - Given that Engineering Technician Education accreditation is normally voluntary, describe the degree of participation.

3. Engineering Technician Education Accreditation System
    - Provide a description of the Engineering Technician Education Accreditation Board including its composition and authority.
    - Provide the criteria for Engineering Technician Education accreditation (general, program specific; curriculum content-technical and non-technical; incorporation of practical experience; length of the program; naming of the program; faculty requirement, etc.)
    - Provide detailed policies and procedures for conducting the Engineering Technician Education accreditation evaluation and making the accreditation decision, include relevant documentation (initiation of visit; self-evaluation questionnaire; selection of accreditation evaluation team; organisation of the visit; due process).
    - Provide a list of currently accredited programs.

4. Changes Made

- Provide information on changes made since last review.
- Provide information to demonstrate evidence of continuous improvement.

4.2 Appointment of Review Team

The FEIAP Engineering Education Standing Committee will appoint a three-person review team to conduct the monitoring process. Each of the reviewers represents a different member economy. Members of the review team should be completely independent of the member economy under review and have the necessary knowledge, experience and expertise to conduct the review. The member economy under review may request that reviewers be replaced, if there is a possible conflict of interest.

4.3 Evaluation Process

The review process involves the following:

1. Evaluation of the submitted documents;

2. Monitoring visit should include the following meetings:

- visit to the accreditation office of the member economy under review;
- observation and evaluation of at least two accreditation visits at cross-sectional institutions;
- post-visit team meeting to structure the monitoring report;
- observation and evaluation of the decision making process of the member economy under review, in which the decisions on the observed accreditation visits are to be reached.

3. Submission of an monitoring report to the FEIAP Engineering Education Standing Committee no less than 60 days prior to the next meeting of the FEIAP General Assembly recommending to the member economies whether the member economy under review continue to meet the FEIAP Engineering Education for Engineering Technician requirements for substantial equivalency. The report shall include:

- an executive summary outlining major system characteristics and citing recommended action with the appropriate action statement;
- an overall introduction to the accreditation system under review and its standards;
- information on accreditation policies, procedures and criteria for the system under review, including a comprehensive analysis of how the accreditation recognition process address marginal, difficult conditional actions;
- A brief description of the educational provider and a listing of the programs observed and accredited results in order set the context for the review;
- indications of any stated or observed substantial deviations to the accreditation criteria, policies or procedures of the system under review and the rationale for the change;

- a statement as to whether the standard of the graduates of accredited programs are substantially equivalent to graduates of other members of the FEIAP;
- any statement of weakness or deficiency; and
- recommended action.

4.4 Evaluation Standards

1) Accreditation Standards
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework:

- Graduate Outcomes Specification;
- Education Environment;
- Program Design, Structure, Content and Assessment Processes;
- Quality Systems.

2) Accreditation Procedures
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework:

- Documents to be Provided by Programs;
- Composition of Accreditation Team;
- Duration of Accreditation Visit;
- Structure of the Accreditation Visit;
- Verification and Validation of the Report by the Accreditation Agency;
- Decision on Accreditation;
- Publication of Accreditation Decisions;
- Procedures of Appeals.

3) Governance of the Accreditation Board
The member economy under review must continue to be compliant with the requirements stipulated in FEIAP Engineering Education Accreditation System Model Framework:

- Official Status;
- Mission Statement;
- Activities;
- Resources;
- Leadership and Management;
- Independence;
- Accountability and Integrity.

4) Continuous Improvement
The member economy under review must demonstrate that it continues to take measures to improve its accreditation system, not only for the purpose of fulfilling requirements of the FEIAP Engineering Education System Model Framework, but also for elevating its contribution

to the development of engineering Technician education within the economy as well as the FEIAP community.

4.5 Decision Making

The FEIAP Engineering Education Standing Committee will evaluate the monitoring report prepared by the review team, and confirm whether the member economy continues to meet the FEIAP Engineering Education for Engineering Technician requirements for substantial equivalency. The categories of recommendations are:

1. The member economy under review be accepted by FEIAP for a period of six years, based on a determination that its accreditation processes lead to outcomes substantially equivalent to the systems known to the monitoring review team;

2. The member economy under review be accepted by FEIAP for a period of no more than two years subject to the submission of a report which satisfies that adequate steps are being taken to address the specific issues identified by the monitoring review team;

3. Due to serious deficiencies, the member economy is reclassified immediately to conditional status and that urgent and specific assistance be offered by FEIAP.

4.6 Expenses

Expenses incurred as a result of the periodic monitoring review, such as airfare (less than five hours, economy class; more than five, business class), visa application, accommodation, etc., must be borne by the member economy under review.

APPENDIX 1
Graduate Attribute Profiles for Engineering Technician (International Engineering Alliance)

References to the Knowledge Profile are shown thus: (DK1 to DK4) (Refer to Appendix 2)

Differentiating Characteristic	Graduate Attribute
Engineering Knowledge:	**DA1:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in DK1 to DK4 respectively to wide practical procedures and practices.
Problem Analysis Complexity of analysis	**DA2:** Identify and 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: Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	**DA3:** Design solutions for *well-defined* technical problems and *assist with* the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (DK5)
Investigation: Breadth and depth of investigation and experimentation	**DA4:** Conduct investigations of *well-defined* problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.
Modern Tool Usage: Level of understanding of the appropriateness of the tool	**DA5:** Apply appropriate techniques, resources, and modern engineering and IT tools to *well-defined* engineering problems, with an awareness of the limitations. (DK6)
The Engineer and Society: Level of knowledge and responsibility	**DA6:** Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well defined engineering problems. (DK7)
Environment and Sustainability: Type of solutions.	**DA7:** Understand and evaluate the sustainability and impact of engineering technician work in the solution of well defined engineering problems in societal and environmental contexts. (DK7)
Ethics: Understanding and level of practice	**DA8:** Understand and commit to professional ethics and responsibilities and norms of technician practice. (DK7)
Individual and Team work: Role in and diversity of team	**DA9:** Function effectively as an individual, and as a member in diverse technical teams.

Differentiating Characteristic	Graduate Attribute
Communication: Level of communication according to type of activities performed	**DA10:** Communicate effectively on *well-defined* engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions
Project Management and Finance: Level of management required for differing types of activity	**DA11:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments
Lifelong learning: Preparation for and depth of continuing learning.	**DA12:** Recognize the need for, and have the ability to engage in independent updating in the context of specialized technical knowledge.

APPENDIX 2
Knowledge Profiles for Engineering Technician (International Engineering Alliance)

A Dublin Accord programme provides:
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 recognised practice area.
DK7: Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

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and all others who have provided assistance in one way or another but whose names have been inadvertently left out.

FEIAP

ENGINEERING EDUCATION GUIDELINES
(Engineering Technician)

12 July 2018

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

ATTACHMENT C

UNESCO – ISCTIC
Handout

Africa, Asia and the Pacific Accord (AAP Accord)
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Educational, Scientific and
Cultural Organization

Malaysia
Fund-in-Trust

Supporting South-South Cooperation on Accreditation of Engineering Education Qualifications and Mobility of Engineers in Asia Pacific and Africa

With the global world of today, to be competitive, engineers from developing countries are called to have adequate and updated professional knowledge and competencies to be able to compete with their counterpart from the developing countries. Within the framework of the Malaysian Cooperative Trust Fund to enhance South-South cooperation for capacity building in education and science for the benefit of the Least Developed Countries (LDCs), Small Island Developing States (SIDS) in Asia and the Pacific, linking with African countries; there is a crucial need to leveraging scientific knowledge, engineering and technology as a way to equip individuals and communities with the knowledge, skills and attitudes to live, work and act in any country and region of the world.

UNESCO in association with the engineering bodies has a leading experience in raising the standard of engineering qualifications in universities and institutions of its Member States. In this regards, UNESCO Office, Jakarta in collaboration with the International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC) and the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) is working on a project aiming at fostering policies and capacity-building in science, technology and innovation, with special emphasis on the science, technology and engineering in Asia and the Pacific through knowledge exchange and mutual learning.

South-South Cooperation on Accreditation of Engineering Education Qualifications

Taking into account the knowledge disparities between countries of the region in terms of science, engineering and technology literacy, there is a need south-south learning alliances. This can be supported by modular curricula programmes on varying levels and topics and adapted to a virtual (e-learning) mode of delivery for adoption by professional bodies and universities.

A first group of pilot countries in Asia and the Pacific have been identified (Pakistan, Papua New Guinea, Myanmar and Timor Leste) and the link with African countries such as Cameroon, Ghana, Nigeria, Tanzania and Sudan. In these countries, UNESCO - ISTIC - FEIAP cooperation is assessing and updating the accreditation system, develop training for assessors on accreditation assessment techniques and provide specific training for professors and teachers on out-based engineering education.

FEIAP has developed an "Engineering Education Guidelines" that is used to assist membership of FEIAP and the pilot countries to achieve the engineering qualification standards that is required to become internationally competitive.

Ensuring Mobility of Engineers in Asia Pacific and Africa

Professional recognition of engineering qualifications is generally straightforward at a national level, however across a border it can become a serious problem and, indeed, some engineering qualifications are not a regulated profession in some countries. Hence mobility continues to be a very difficult issue, despite international accreditation agreements and accords.

With ongoing globalization, enterprises are now looking for competences more on the global market, rather than focusing on local resources. With this in mind, engineering should not be limited by national or regional borders. Thus, especially engineering should not be limited by national borders. It is therefore important to ensure that engineers from the South are well prepare to answer to the globalized world and all its challenges.

By improving the quality of engineering education in Asia and the Pacific and Africa, from national standard to an international standard, this project will enable engineers from one continent to move and work in the other continent without any barrier. Supporting international mutual recognition agreements between countries of Asia and the Pacific and linking with Africa, will help to increase the level of operation and recognition of engineers. This will also help to develop international experience that benefits not only the individual engineer, but the companies that employ them, and the communities they serve.

By improving the Engineering Education, mutual recognition of engineering qualifications from one country or region and overseas engineering qualifications will be recognized according to the "Engineering Education Guidelines" of FEIAP which will remove barriers to professional mobility of engineers

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

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FAEO

Africa, Asia and the Pacific Accord (AAP Accord)

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