



INSTITUTION OF ENGINEERS SINGAPORE

APEC ENGINEER COMPETENCE AGREEMENT (APECEA)

APEC Engineer Register

ASSESSMENT STATEMENT (effective 1 July 2019)

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INTRODUCTION

1 The APEC Engineer

- 1.1 An APEC Engineer is defined as a person who is recognised as equivalent to a professional engineer within an APEC economy, and who has satisfied an authorised body in that economy, operating in accordance with the criteria and procedures prescribed in The APEC Engineer Manual – The Identification of Substantial Equivalence, a copy of which is available on APEC web site at:
http://publications.apec.org/publication-detail.php?pub_id=608

2 Objective of APEC Engineer Register

- 2.1 Each Authorised body, also called the Monitoring Committee, in an APEC economy will arrange to provide timely and accurate information on the status of any practitioner claiming to be listed on its APEC Engineer Register to any person or organisation having a legitimate need for access to such information, to exchange relevant data with the other authorised Monitoring Committees, and, within their economy, to function as a single point of contact on all matters relating to APEC Engineers.
- 2.2 Each Monitoring Committee further undertakes to:
- a) accept and promote the substantial equivalence of the competence of APEC Engineers registered by other Monitoring Committees;
 - b) make every reasonable effort to ensure that the bodies responsible for registering or licensing professional engineers to practise within their economy recognise that APEC Engineers have general technical and professional competence substantially equivalent to that of engineers already registered or licensed in that economy;
 - c) ensure that all practitioners registered by them as APEC Engineers comply fully with the requirements specified in the APEC Engineer Framework, and that a substantial majority of these practitioners have demonstrated their compliance through the primary procedures and criteria set out in the Assessment Statement for that economy;
 - d) ensure that practitioners applying for registration as an APEC Engineer are required to provide evidence that they have engaged in an appropriate level of recent continuing professional development; and
 - e) ensure that practitioners registered by them as APEC Engineers apply from time to time for renewal of their registration, and, in so doing, provide evidence that they have engaged in an appropriate level of recent continuing professional development.

- 2.3 The Monitoring Committee in each APEC economy recognise that a mutual exemption framework, which would confer exemption, in whole or in part, upon APEC Engineers from further assessment by the statutory bodies that controlled the right to practise in each participating economy, can be concluded only with the involvement and consent of those statutory bodies and the relevant governments. Only complete or partial exemption of APEC Engineers from the assessment mechanisms operating in the host jurisdiction is at issue, not exemption from the requirement to become licensed or registered in the economy concerned.

3 Purpose of Assessment Statement

- 3.1 This Assessment Statement provides a framework for the assessment of qualified practitioners for placement on the APEC Engineer Register by Singapore's Monitoring Committee.

PART A:

THE MONITORING COMMITTEE

4 Background on related engineering institutions in Singapore

The Institution of Engineers Singapore (IES)

- 4.1 The Institution of Engineers, Singapore (IES) was formally established on July 1966 as the national society of engineers in Singapore. The IES is the premier engineering Institution in Singapore and is often called upon by the Government to provide feedback on professional engineering matters. Its mission is to advance and promote the science, art and profession of engineering for the well-being of mankind. Its objectives are:
- a) To enhance the character and status and to advance the interest of the profession of engineering and those engaged therein.
 - b) To promote honourable practice and mutual respect, and to decide all questions of engineering practice and etiquette affecting members of the Institution.
 - c) To provide quality service to its members and the nation; and
 - d) To provide opportunity for continuing professional development and promote fellowship among members.
- 4.2 IES is a national institution which is the representative of the engineering profession in all branches and sectors of engineering in Singapore.
- 4.3 The affairs of IES is governed by a body called the Council. The Council consists volunteers who are members of IES. The Council consists of the President, One Deputy President, Five Vice-Presidents, 21 General Members including Honorary Secretary, Assistant Honorary Secretary, Honorary Treasurer, Assistant Honorary Treasurer. For the first year of the President's two-year term, there will be 6 Vice-Presidents and no Deputy President.

The Association of Consulting Engineers Singapore (ACES)

- 4.4 The Association of Consulting Engineers Singapore is a non-profit making association representing the independent consulting engineering profession in Singapore. Formed in 1971, ACES is an industry grouping seeking to set and maintain standards of professional ethics, public accountability and independence amongst its members who are all directors or partners of consulting engineering firms operating in Singapore in compliance with the Professional Engineers Act and its regulations. ACES also has business interests of its members high on its agenda and seeks to ensure that professional consulting engineers in Singapore are adequately and fairly rewarded for their services. The objects for which ACES is established are:
- i) to promote the advancement of the profession of Consulting Engineering.
 - ii) to associate together for the purpose of cooperation and mutual advantage and consultation as Consulting Engineers as defined in the Constitution.

- iii) to promote the professional interests, rights, powers and privileges of Consulting Engineers.
- iv) to give legislature, Public Bodies and others, facilities for conferring with and ascertaining the collective views of Consulting Engineers.
- v) to confer with Associations representing Manufacturers, Contractors and other persons engaged in engineering works on matters of common interest.

Professional Engineers Board Singapore (PEB)

- 4.5 The Professional Engineers Board is a statutory body which administers the Professional Engineers Act (PE Act), which is an Act of Parliament that provides for the registration of professional engineers (PEs), regulates the qualifications and conduct of PEs and regulates corporations which supply professional engineering services in Singapore. PEB's mission is to safeguard life, property and welfare of the public by setting high standards for registering and regulating PE. Its main objective of the registration of PEs is to ensure that engineering works that involve public safety and interest are carried out by engineers who are competent.
- 4.6 The PE Act requires applicants for registration as PEs to possess an engineering degree of acceptable standard as well as an adequate and relevant post-graduate engineering work experience. PEB had previously registered PEs in 12 engineering disciplines (namely Civil (including Structural), Mechanical, Electrical, Electronic, Aeronautical, Marine, Naval Architecture, Manufacturing (including Production), Industrial, Information Technology & Computer Engineering, Environmental and Chemical). However, it presently will register PEs in only 4 engineering disciplines, where works involving public safety will be regulated by the authorities, namely, Chemical, Civil, Electrical, and Mechanical.

The APEC Engineer Monitoring Committee Singapore (AEMCS)

- 4.7 The IES shall be the assessing body for qualifications and experience required for placement on the APEC Engineers Register. The functions of the APEC Engineer Monitoring Committee, Singapore (AEMCS) will be undertaken by the IES's Chartered Engineers Board (CEB), which will perform AEMCS's roles with the following Terms of Reference:
- i) develop and maintain an assessment system to ensure that APEC Engineers meet the conditions of registration;
 - ii) develop and maintain a Register of APEC Engineers in Singapore;
 - iii) audit continuing compliance by APEC Engineers with the conditions of registration;
 - iv) receive, investigate and resolve complaints against APEC Engineers;
 - v) maintain and disseminate a list of persons whose APEC Engineer registration has been cancelled;
 - vi) participate in deliberations of the APEC Engineer Coordinating Committee;
 - vii) submit statements and such other information as may be required by the Coordinating Committee to enable the Coordinating Committee to review the proposed system;
 - viii) publish information on its assessment procedures, criteria, systems and performance;
 - ix) maintain records and documents in a form suitable for review by member economies;

- x) provide representatives to assist in reviewing other assessment systems; and
- xi) function as a single point of contact on all matters relating to APEC Engineers in Singapore, including timely and accurate information on whether individuals are APEC Engineers.

4.8 All references to the AEMCS will be hereinafter refer to CEB. The list of members of CEB is posted on the IES web site.

4.9 The contact person for the purposes of AEMCS is:

Registrar, Chartered Engineers Board
c/o The Institution of Engineers, Singapore
70 Bukit Tinggi Road
Singapore 289758
Tel : (65) 64695000
Fax : (65) 64671108
Email : iesnet@singnet.com.sg

PART B:

CRITERIA FOR REGISTRATION

5 Requirements for admission in APEC Engineer Register

- 5.1 AEMCS shall grant registration in APEC Engineer Register to a candidate if he/she:
- i) has met the prescribed academic qualification;
 - ii) has obtained at least 7 years of practical work experience in engineering since graduation;
 - iii) has spent at least 2 years in responsible charge of significant engineering work;
 - iv) has been assessed as eligible for independent practice in engineering;
 - v) maintains continuing professional development in accordance with the requirements in this Assessment Statement; and
 - vi) agrees to be bound by the prescribed Code of Professional Conduct and Ethics.
- 5.2 The candidate shall submit an application for registration in APEC Engineer Register which shall be in the format as described in Part D and in the engineering disciplines/sectors as prescribed in Part C.

6 Prescribed academic qualification

- 6.1 Candidates to be placed on the APEC Engineers Register shall possess a prescribed academic qualification. An engineering program which meets the prescribed academic qualification is either:
- a) an engineering program which has been accredited by Engineering Accreditation Board (EAB) of The Institution of Engineers, Singapore. The criteria and procedures for accreditation of engineering programs are provided in the Accreditation Manual of Engineering Accreditation Board, The Institution of Engineers Singapore, a copy of which is available at:
<https://www.ies.org.sg/Accreditation/EAB10249>;
 - b) a Degree of Bachelor of Engineering from the National University of Singapore, the Nanyang Technological University or the University of Singapore prior to EAB being full signatory of the Washington Accord in 2006¹;
 - c) a graduate of a foreign university whose engineering program is accepted for registration as a professional engineer, as listed in Professional Engineers (Approved Qualifications) Notification (read in conjunction with Professional Engineers (Approved Qualifications) (Amendment) Notification 2016), copies of which are available at:

¹ Prior to IES/EAB being admitted as full signatory of the Washington Accord, the engineering programs from the National University of Singapore, the Nanyang Technological University were accredited by constituent institutions of EC UK.

- [https://www.peb.gov.sg/Downloads/PE%20\(Appeared%20Qualifications\)%20Notification%202009.pdf](https://www.peb.gov.sg/Downloads/PE%20(Appeared%20Qualifications)%20Notification%202009.pdf)
- <https://www.peb.gov.sg/Downloads/PE%20Approved%20QualificationsAmendment%20Notification%202016.pdf>; or

d) any other proper and recognised training in engineering, had passed the prescribed Examination by the PEB, and is deemed by PEB to have satisfied the academic qualification requirement for registration as PE.

7 Practical work experience

7.1 Candidates to be placed on the APEC Engineers Register shall have **at least 7 years** of relevant practical work experience in engineering after completing the prescribed academic qualification. A report describing the type, significance and level of responsibility of the engineering work experience at a professional level shall be submitted for assessment.

7.2 Acceptable engineering work experience includes –

- (i) engineering design work;
- (ii) supervising execution of engineering works;
- (iii) engineering investigation;
- (iv) evaluation of engineering proposals;
- (v) engineering research and development;
- (vi) testing and commissioning of engineering works; or
- (vii) engineering management.

8 Responsible charge of significant engineering work

8.1 A candidate should have spent **at least 2 years** in responsible charge of significant engineering work and this period could be within the course of the practical experience since graduation. Responsible charge of significant engineering work refers to having a significant influence on the technical direction of engineering projects or programs, which may involve –

- i) planning, designing or implementing a complete engineering project;
- ii) undertaking a substantial part of engineering project while understanding the total project concept; or
- iii) undertaking a project that requires multi-disciplinary, complex or novel work responsibility.

9 Independent Practice

9.1 A candidate should possess the knowledge and skills specified in the Characteristics or Indicators of each Elements of the Competency Standard as specified in Part D. The Elements are adapted from the professional competencies outlined in International Engineering Alliance’s “Graduate Attributes and Professional Competencies” for the class of Professional Engineer. Fulfilment of this requirement is to be confirmed through assessment in the Professional Review Interview through

evidence of responsibility for engineering activities from adoption of a personal sense of responsibility for their work.

10 Continuing Professional Development

- 10.1 APEC Engineers are required to participate in IES's continuing professional development (CPD) programme. Before APEC Engineer can renew their annual registration, they are required to meet the prescribed CPD requirements.
- 10.2 The IES's prescribed CPD requirements for APEC Engineer is at Annex A "Continuing Professional Development (CPD) Framework"
- 10.3 The objectives of the CPD programme are to reinforce the need for lifelong learning and to provide a framework through which professional engineers could systematically maintain and enhance competency to do a job in their area of expertise.

11 Code of Professional Conduct and Ethics

- 11.1 APEC Engineers are required to sign a declaration that he/she –
 - (a) shall only practice within the areas of his/her competence; and
 - (b) shall be bound by the IES's Code of Professional Conduct and Ethics, a copy of which is in Annex B "The Institution of Engineers, Singapore Rules for Code of Professional Conduct and Ethics".

PART C:

ENGINEERING DISCIPLINES/SECTORS

12 General requirement

- 12.1 AEMCS has resolved to support the registration of engineers in disciplines and sectors that correspond to general areas of practice by PEs and Chartered Engineers in Singapore.

13 Engineering Disciplines/Sectors

- 13.1 An engineer may be registered on APEC Engineer Register in any one of the following disciplines/sectors –

Disciplines:

- i) CIVIL
- ii) STRUCTURAL
- iii) ELECTRICAL
- iv) MECHANICAL
- v) GEOTECHNICAL

Sectors:

- i) AEROSPACE
- ii) CHEMICAL & PROCESS
- iii) ENVIRONMENTAL & WATER
- iv) ENGINEERING PROJECT MANAGEMENT
- v) ENERGY
- vi) INFRASTRUCTURE
- vii) PORT & MARINE
- viii) RAILWAY & TRANSPORTATION
- ix) SYSTEMS ENGINEERING

- 13.2 A candidate can be registered in one or more disciplines/sectors, provided he/she meets the requirements in each and every one of the disciplines/sectors he/she is to be registered in.

14 Indicative Area of Practice

- 14.1 Candidates shall satisfy the requirements in relation to each area of practice in which they apply to be registered on APEC Engineer Register. The indicative area of practice for each discipline/sector is as listed below.

14.2 **Civil Engineering**

APEC Engineers in Civil Engineering discipline are concerned with materials such as steel, concrete, timber, earth and rock, and with their application in the research, design, development, manufacture, construction, operation, maintenance and management of hydraulic, structural, environmental and systems aspects of infrastructure works and services such as water, sewerage, transport, urban development and municipal services, and with building and construction for other infrastructure industries.

14.3 **Structural Engineering**

APEC Engineers in Structural Engineering discipline have expertise in research, planning, design, construction, inspection, monitoring, maintenance, rehabilitation and demolition of permanent and temporary structures and structural systems and their components and with associated technical, economic, environmental, aesthetic and social aspects. Structures might include buildings, bridges, in-ground structures, footings, frameworks and space frames, including those for motor vehicles, space vehicles, ships, aeroplanes and cranes, composed of any structural material including composites and novel materials.

14.4 **Electrical Engineering**

APEC Engineers in Electrical Engineering discipline are concerned with research, design, development, manufacture, installation, operation, maintenance and management of equipment, plant and systems within the electrical, electronic, communication and computer systems areas. Electrical Engineering is applied to electrical power generation, transmission, distribution and utilisation, manufacture, instrumentation and control in industry, communications networks, electronic plant and equipment, integration and control of computer systems.

14.5 **Mechanical Engineering**

APEC Engineers in Mechanical Engineering discipline are concerned with research, design, development, evaluation, manufacture, installation, testing, operation, maintenance and management of machines, machine and thermodynamic processes, and manufacturing and materials handling plants and systems. Mechanical Engineering is applied to manufacturing, transport, electricity generation, and in works and services using machine systems, including the environment of building interiors. Applicants must have experience in the safety aspects of design and/or operation of machines, plant, systems or processes.

14.6 **Geotechnical engineering**

APEC Engineers in Geotechnical Engineering discipline are concerned with the planning, investigation, design, construction and maintenance of works involving the ground, and works constructed from excavated natural materials.

14.7 **Aerospace**

APEC Engineers in Aerospace Engineering sector have expertise in aerodynamics, propulsion, avionics, flight performance and knowledge in materials science, interior, structures analysis, manufacturing, maintenance and repair for aircraft and spacecraft systems. They are concerned with the research and development, design, manufacture, integration, testing, maintenance and repair of aircraft and spacecraft, systems and their components. A key aim of Aerospace Engineering is to ensure aircraft are airworthy in accordance with regulatory requirements. Aerospace engineers are also involved in development of new technologies for use in aviation, space and defence systems.

14.8 **Chemical & Process**

APEC Engineers in Chemical & Process Engineering sector are concerned with design and operations of chemical plants and process (including systems safety aspects), industrial processing and fabrication of products through chemical or physical changes, instrumentation and control for protection of the environment.

14.9 **Environmental & Water**

APEC Engineers in Environmental and Water Engineering sector is concerned with the engineering for the protection of the environment and natural resources. It requires fundamental understanding of environmental science and an appreciation of the mechanics of environmental systems to enable study, investigation, design, management & control of such systems.

Collectively and holistically, they apply an integrated approach to technical, economic, social, legal and scientific considerations. Environmental and Water Engineers work on new or existing projects that require some form of improvement, remediation or rehabilitation in the natural and built environment. Environmental and Water Engineers work in many areas of environmental protection and water treatment including water quality, waste water and storm water management, solid and hazardous waste management, contaminated land remediation, natural resource management, pollution control, air quality, noise management, greenhouse gas emission reduction, environmental management systems, environmental information systems, environmental impact assessment, social impact analysis and environmental risk assessment.

14.10 **Engineering Project Management**

APEC Engineers in Engineering Project Management sector are concerned with competency to manage and control engineering projects in terms of plans, specifications, costs, schedules, resources and risks.

14.11 **Energy**

[To be included at a later date]

14.12 **Infrastructure**

APEC Engineers in Infrastructure Engineering sector are concerned with competency to plan, design, optimise and develop estates, land, physical and organisational systems and facilities to support operations of communities. Infrastructure include residential, parks, walkways, overhead and underground bridges, commercial, industrial, ports, road networks, transport systems and others. Engineering planning for these infrastructures cover land, connectivity, utilities and operations.

14.13 **Port & Marine**

APEC Engineers in Port & Marine Engineering sector are concerned with developing appropriate solutions to marine and offshore engineering problems. They develop and apply new technologies, introduce new and efficient production techniques, pioneer new engineering services and management methods. They have expertise to design, select, analyse and install marine propulsion, transmission and control systems. They have expertise in the design, dynamic and strength analysis of fixed and floating offshore oil and gas platforms. They are concerned with subsea systems, including marine systems to produce renewable energy. They are also concerned with environmental issues such as engine emissions and performance monitoring as well as safety aspects in Marine & Offshore Engineering sectors.

14.14 **Railway & Transportation**

APEC Engineers in Railway and Transportation Engineering sector is concerned with competency to plan, conduct design, research and development, manufacture, construct, install, operate, inspect, monitor, maintain and manage Railway and Transportation systems & solutions and related infrastructure.

14.15 **Systems Engineering**

APEC Engineers in Systems Engineering sector are concerned with Requirements Engineering, Risk and Opportunity Management, Baseline Control, Technical Planning, Technical Effort Assessment, Architecture/ Design Development, Qualification, Verification & Validation, Process Definition, Tool Support, Training, Systems Integration, Quality Assurance, Specialty Engineering.

15 **Table of disciplines for each sector**

- 15.1 Table 1 below shows main disciplines² which will play a prominent role in each of the sectors.

² The discipline of engineering degrees listed in the matrix are those being awarded by universities in Singapore. Graduates holding engineering degrees in other disciplines will be considered on a case-by-case basis, depending on the relevance to the industry/sector.

Table 1 – Table of disciplines for each sector

Environmental & Water	Aerospace	Chemical & Process	Port & Marine	Systems Engineering	Railway & Transportation	Infrastructure	Energy	Engrg Project Management
	Aerospace		Aerospace	Aerospace				Aerospace
Bioengineering		Bioengineering						
Chemical		Chemical					Chemical	
Civil	Civil	Civil	Civil	Civil	Civil	Civil	Civil	Civil
Computer Engr	Computer Engr		Computer Engr	Computer Engr	Computer Engr			Computer Engr
Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical
	Electronics		Electronics	Electronics	Electronics			Electronics
				Engrg Product Dev				Engrg Product Dev
Engrg Sc	Engrg Sc		Engrg Sc	Engrg Sc	Engrg Sc			Engrg Sc
Environmental		Environmental	Environmental	Environmental			Environmental	Environmental
Industrial	Industrial		Industrial	Industrial	Industrial	Industrial		Industrial
Info Systems	Info Systems		Info Systems	Info Systems	Info Systems	Info Systems		Info Systems
	Manufacturing		Manufacturing		Manufacturing			
Materials Engr	Materials Engr	Materials Engr	Materials Engr	Materials Engr	Materials Engr		Materials Engr	Materials Engr
Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
						Sustainable Infra Engrg		

PART D: ASSESSMENT FRAMEWORK

16 Elements of Competency Standard

- 16.1 The Competency Standard is the ability to perform 12 elements that represent broad practice areas expected at professional engineering level. These elements are adapted from the professional competencies outlined in International Engineering Alliance’s “Graduate Attributes and Professional Competencies” for the class of Professional Engineer. These 12 elements comprise the following –

S/n	Descriptor	Elements
(1)	Comprehend and apply knowledge	Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice to the local practice
(2)	Problem analysis	Define, investigate and analyse complex problems
(3)	Design and develop solutions	Design or develop solutions to complex problems
(4)	Evaluation	Evaluate the outcomes and impacts of complex activities
(5)	Protection of society	Recognise the reasonably foreseeable social, cultural and environmental effects of complex activities generally, and have regard to the need for sustainability; recognise that the protection of society is the highest priority
(6)	Legal and regulatory	Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities
(7)	Ethics	Conduct his or her activities ethically
(8)	Manage engineering activities	Manage part or all of one or more complex activities
(9)	Communication	Communicate clearly with others in the course of his or her activities
(10)	Lifelong learning	Undertake CPD activities sufficient to maintain and extend his or her competence
(11)	Judgement	Recognize complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgement in the course of his or her complex activities

S/n	Descriptor	Elements
(12)	Responsibility for decisions	Be responsible for making decisions on part or all of complex activities

- 16.2 Examples of characteristics or indicators of each of these 12 elements that the form the assessment framework are given in Annex C “Characteristics or Indicators of each elements of Competency Standard”.
- 16.3 It is expected that an engineer would typically require at least 4 years of practical working experience in order to acquire these elements of professional competencies.

17 Assessment Panels

- 17.1 AEMCS will appoint Assessment Panels each comprising a Lead Assessor and 2 Assessors who are senior and experienced engineers to review and assess applications to be placed on the APEC Engineer Register. The assessment by Assessment Panels shall include a professional review interview with the engineer applicant. The Assessment Panels will make their recommendations to the AEMCS on whether an engineer should be place on the register.
- 17.2 The composition of each Assessment Panel to be appointed will be based on the following criteria:
- (a) all members of the Panel are either registered PE or CEng (Singapore);
 - (b) all members have at least 10 years of relevant work experience; and
 - (c) either (i) at least 1 out of the 3 members of the Panel will be from similar domain areas as the engineer to be assessed, or (ii) all 3 members of the Panel are members of the Monitoring Committee.
- 17.3 In order to avoid possible conflict of interest, members of the Panel are not expected to have or have had a close, active association with the engineer or the engineer’s work experience. Close/active association are, for example
- (a) being a relative of the engineer by birth or marriage; and
 - (b) employment, either currently or within the past 3 years, as staff or consultant by the organisation at which the engineer’s work experience was obtained.

18 Professional Review Interview

- 18.1 The Professional Review Interview, which is a mandatory part of the Assessment Framework. is to be conducted by an Assessment Panel.
- 18.2 The Interview will not be carried out if the AEMCS is satisfied that the academic qualifications have not satisfied the prescribed acceptable academic qualification.
- 18.3 The Interview will be based on the information provided in the application, from which the Assessment Panel will determine if the engineer has largely met the elements of the Competency Standard.

19 Assessment Report and Decision

- 19.1 Assessment Panels will prepare and submit its assessment report & recommendations, on the prescribed form, to the AEMCS. The AEMCS will review the report and recommendation to ensure that the procedures for assessment is adequate and there are no discrepancy and inadequacy.
- 19.2 The AEMCS will approve the recommendation by the Assessment Panel to register an engineer through a positive vote of more than half of the committee members of the AEMCS.

20 Notice of the Results

- 20.1 AEMCS will inform all candidates of the results of its assessments, including providing reasons for refusal to register, where applicable.

PART E:

APPLICATION GUIDANCE

21 Who is eligible to apply

- 21.1 Application for registration as APEC Engineer in Singapore is open only to IES Corporate Member. Please refer to IES web site on how to apply to be an IES Corporate Member.
- 21.2 The AEMCS may refuse to register an engineer who in the opinion of the AEMCS is not of good character or reputation.

22 Application form

- 22.1 The Application Form is available for download from the IES web site.

23 Application fee

- 23.1 The IES may impose a fee to cover the cost of processing the application and the assessment by the Assessment Panels. The application fee is shown on the Application Form.

24 Renewal of registration

- 24.1 APEC Engineers will be required to renew their registration annually in order to remain on the register.
- 24.2 APEC Engineer should meet the following requirements before renewal can be granted:
 - (a) remains on PEB's register of PE with practising certificate, or IES's register of Chartered Engineer;
 - (b) has complied with the CPD requirements; and
 - (c) has not been removed from the APEC Register following a disciplinary action by the AEMCS.
- 24.3 The annual fee is shown on the Annual Renewal Form which is available for download from the IES web site.

25 Obligations of APEC Engineers

25.1 APEC Engineers are assessed for competence in the practice area of their engineering discipline or sector which they have chosen. In accordance with IES's Rules for Professional Conduct and Ethics, APEC Engineers shall work only within their area of competence and should not offer to provide engineering services that lies outside their area of expertise.

26 Disciplinary action

- 26.1 A complaint against any APEC Engineer relating to contravention of the rules of professional conduct and ethics shall be lodged with the Secretary of the AEMCS.
- 26.2 If the AEMCS has determined the complaint to be bona fide, the AEMCS will constitute an Investigation Committee to investigate into the complaint and make recommendation to the AEMCS.
- 26.3 Any action to be taken by the AEMCS against the APEC Engineer, including removal from the register, shall not be taken unless the APEC Engineer has been given an opportunity of being heard.

27 Dispute resolution

- 27.1 An engineer may appeal against the refusal to be placed on the APEC Engineer register if he/she believes that the assessment outcome is not appropriate.
- 27.2 An APEC Engineer may appeal against the decision of the AEMCS to remove him/her from the register.
- 27.3 An appeal must be made in writing to the Honorary Secretary, Council of IES within 30 days after receiving notification of refusal or removal. The appeal should be accompanied by a report to substantiate the request.
- 27.4 The Council of IES will appoint an Appeal Committee comprising not less than 3 members to consider the request based on the report submitted by the appellant and respond with its recommendations within 90 days.
- 27.5 The Council of IES will consider the findings of the Appeal Committee and arrive at a final decision within 90 days after receipt of the appeal.
- 27.6 If the appeal is denied, the IES Council will provide the appellant with reasons for the decision.
- 27.7 If a review of the certification is necessary, the IES Council, in consultation with the AEMCS, will appoint another Assessment Panel to carry out the review.
- 27.8 If appeal for reinstatement on the register is successful, the AEMCS will reinstate the APEC Engineer on the register.

- 27.9 The IES Council may impose a fee for lodgement of an appeal. The fee will be refunded to appellant's membership account if the outcome is in appellant's favour, but there will be no refund if the original decision is confirmed.

ANNEX A:

CPD FRAMEWORK

D1 Continuing Professional Development Framework³

D2.1 In this fast-changing environment, there is a need for APEC Engineers to adopt a lifelong learning process to maintain and update their professional competence on a continuing basis.

D2.2 As an APEC Engineer may be operating under circumstances which are unique to him, the focus of the CPD activities is best left to each APEC Engineer to decide. The principle is that the relevant CPD activities must be those related to the scope of practice of each APEC Engineer. There is therefore no prescribe rules as to the nature and type of activities to be undertaken but each APEC Engineer will be given the flexibility to select from amongst a broad range of activities. The range of activities in this CPD programme is not intended to be inclusive but to act as a general guide. The activities that would be relevant are those that will enable one to:

- a) maintain, improve, or expand technical skills and knowledge;
- b) keep abreast of changing procedures and standards;
- c) understand and apply advances in technology;
- d) better serve the engineering profession, community and environment;
- e) develop communication and management skills; and
- f) broaden into related fields, such as those covering management, financial or legal aspects.

D2 Definitions

D2.1 The terms used in this document have the following meanings:

- a) “contact hour” refers to an attendance or involvement lasting one clock hour of not less than 50 minutes;
- b) “professional development units” or “PDU” refers to the unit of measure for effort in continuing professional development program;
- c) “renewal qualifying period” refers to a 12-month period immediately preceding the application for renewal of registration;
- d) “structured activity” refers to a course or activity that is accredited by the PEB or the IES or which involves active participation;
- e) “unstructured activity” refers to an activity that involves self-directed learning, reading, discussion or participation.

D3 Requirement

D3.1 Every APEC Engineer who wishes to renew his registration is required to obtain a minimum of 40 PDUs over the renewal qualifying period. The 40 PDUs shall

³ Adapted from the Professional Engineers Board, Singapore

comprise a minimum of 15 PDUs in structured activities, and the remainder can be obtained from either structured or unstructured activities.

D3.2 The determination of PDUs in structured and unstructured activities is in Appendix 1.

D4 **Carrying over of excess PDUs**

D4.1 If an APEC Engineer exceeds the annual requirement in one renewal qualifying period, a maximum of 40 PDUs from excess PDUs obtained from structured activities may be carried forward into the next renewal qualifying period.

D5 **Insufficient PDU for renewal of registration**

D5.1 An APEC Engineer who has not obtained sufficient PDUs in the renewal qualifying period to meet the requirement for renewal of his registration may apply to have his registration renewed by providing reasons for the failure to meet the requirement. The AEMCS may renew his registration and may impose a condition that the shortfall in PDUs in that renewal qualifying period has to be obtained during the following renewal qualifying period. The PDUs to be obtained in the next renewal qualifying period to meet the shortfall would not be used for the renewal of the registration for the next renewal period.

D6 **Reinstatement after a lapse of 3 years**

D6.1 An APEC Engineer whose registration had lapsed for 3 years or more is required to obtain 80 PDUs within the renewal qualifying period, of which at least 30 PDUs must be obtained from structured activities.

D7 **Exemptions**

D7.1 An APEC Engineer may be exempt, subject to review and approval of the AEMCS, from CPD requirements if he experiences physical disabilities, prolonged illness or other extenuating circumstances.

D8 **Records**

D8.1 When applying for renewal of registration, an APEC Engineer is to submit the Annual Renewal Form (which can be downloaded from the IES web site) which contains a form to record the PDUs obtained during the renewal qualifying period. APEC Engineers do not have to submit documentary evidence together with the Annual Renewal Form. However, APEC Engineers are advised to retain their CPD documentary evidence for a period of at least 2 years.

D9 **Audit Process**

D10.1 The AEMCS will conduct random audit on compliance with CPD. Those selected will be asked to produce documentary evidence of their CPD participation during the particular period. The documentary evidence may take any one of the following forms:

- a) Summary of diary records or a log showing the activities claimed;
- b) Course enrolment record;
- c) Receipts;
- d) Certificate of attendance;
- e) Attendance list from course organiser;
- f) Employer's report or certification.

D10 Accreditation of structured activities

D10.2 Structured activities qualifying under Category 1 can be those accredited by the PEB or the IES. All activities that are accredited by the PEB are posted on the PEB's web site, while those accredited by the IES will be on the IES web site.

APPENDIX I

Requirement: A minimum of 40 PDUs over a renewal qualifying period of 12 months, of which a minimum of 15 PDUs must be from structured activities.

Determination: Structured Activities are listed in Table 1 and Unstructured Activities are listed in Table 2.

Table 1 - Structured Activities

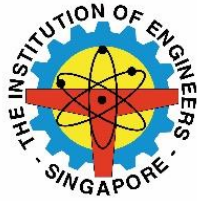
CATEGORY	CRITERIA	PDUs
Category 1(a): Accredited formal study courses	Relevant post-graduate or diploma courses on engineering and/or construction/project management. Example: MSc (Engineering) MSc (Project Management)	1 PDU for each contact hour
Category 1(b): Accredited lectures, short courses, conferences, workshops & seminars	Lectures, short courses, conferences, workshops & seminars which are relevant for professional engineers on technical, management, professional development, legal or regulatory matters. Examples: Seminars on regulatory requirements by government agencies eg. BCA, FSB, ENV, LTA, etc. “Engineers and the Law” by IES Workshops and seminars on engineering topics by NUS or NTU	1 PDU for each contact hour
Category 1(c): Accredited in-house training	Structured in-house training which are relevant to professional engineers on technical, management, professional development, legal or regulatory matters. [CV of speakers to be similar to category 1(a) or 1(b)]	1 PDU for each contact hour

CATEGORY	CRITERIA	PDUs
Category 2: Participation in Professional Boards, Committees and Societies	a) Member of Boards of local Professional institutions or relevant government agencies. Examples: i) Board Member of BCA, LTA, HDB, URA, JTC, PEB and BOA ii) Council Member ACES and IES	8 PDUs per organisation.
	b) Member of relevant technical or working committees of professional associations and government agencies. Examples: i) Member of Technical Committees of government departments and Statutory Boards; ii) Member of technical or other working committees of ACES & IES; iii) Member of approved technical societies.	4 PDUs per Committee (Maximum for this category is 8 PDUs)
Category 3: Contribution to relevant engineering or management knowledge	a) Conduct accredited lectures, seminars, conferences or training courses for the first time. (Exclude regular lectures by full-time lecturers)	4 PDUs for each lecture hour or part thereof
	b) Conduct accredited lectures, seminars, conferences or training courses after the first time. (Exclude regular lectures by full-time lecturers)	2 PDUs for each lecture hour or part thereof
	c) Write or edit technical articles or papers published in distinguished publications, conference proceedings, professional journals or books.	5 PDUs for each topic
	d) Engineering patents registered during the year	15 PDUs for each patent

Table 2 - Unstructured Activities

CATEGORY	CRITERIA	PDU_s
Category A: Self-study of relevant topics	i) Reading of relevant technical, professional, financial, legal or business literature.	1 PDU for every 2 hours (Maximum for this category is 16 PDUs)
	ii) Listening/viewing audio/video tapes on relevant topics or taking correspondence courses.	
Category B: Informal In-house training and discussion	i) Conducting informal in-house training and presentations to colleagues.	1 PDU for every 2 hours (Maximum for this category is 16 PDUs)
	ii) Attending informal in-house training and presentations.	
Category C: Professional Membership	i) Membership of professional engineering or management bodies.	2 PDUs per organisation (Maximum for this category is 16 PDUs)
Category D: Non-accredited engineering activities	i) Attending professional and technical courses which are not accredited.	1 PDU for every 2 hours (Maximum for this category is 16 PDUs)
	ii) Attending organised group technical site visits and exhibitions.	

ANNEX B: IES CODE OF CONDUCT AND ETHICS



THE INSTITUTION OF ENGINEERS, SINGAPORE RULES FOR CODE OF PROFESSIONAL CONDUCT AND ETHICS

[25TH JANUARY 2016]

1. These Rules shall apply to all Chartered Engineers and any other professionals registered under the Institution of Engineers, Singapore (IES) professional registries and engaged in any professional work.
2. Every registered professional shall observe and be guided by Parts I and II of the Code of Professional Conduct and Ethics set out in the Rules.

PART I

1. In this Part, unless the context otherwise requires -

“Board” means IES professional registration board, setting rules and policy includes disciplinary enquiry panel across all registries to ensure consistency and maintain professional standard of practice.

"professional" and any associated pronoun means a registered chartered engineer or any other professional registered under IES professional registry;

“professional services” means operation, maintenance, consultancy or advisory services that require a person to engage in professional work;

“professional work” includes any professional service, consultation, investigation, evaluation, planning, design, or responsible supervision of construction or operation in connection with any public or privately owned public utilities, buildings, machines, equipment, processes, works or projects wherein the public interest and welfare, or the safeguarding of life, public health or property is concerned or involved, and that requires the application of engineering or other technical principles and data;

"publicity" means any form of advertisement and includes any advertisement –

- (a) printed in any medium for the communication of information;
- (b) appearing in, communicated through or retrievable from, any mass medium, electronic or otherwise including but not limited to the internet, and its derivatives, and “publicise”, “publicised” and “publicising” shall be construed accordingly.

2. – (1) A professional shall uphold the dignity, standing and reputation of the profession.

(2) A professional may, subject to these Rules, publicise his or her practice or allow his or her employee or agents to do so.

(3) A professional shall not publicise his or her professional practice in a manner which

- (a) is likely to diminish public confidence in the engineering or the relevant technological profession that the professional is registered under or to otherwise bring the profession into disrepute;
- (b) may reasonably be regarded as being misleading, deceptive, inaccurate, false or unbefitting the dignity of the profession; or
- (c) the Board may determine to be an undesirable manner of publicising his or her practice.

(3A) For the purposes of these Rules, publicity shall be considered to be misleading, deceptive, inaccurate or false if it —

- (a) contains a material misrepresentation;
- (b) omits to state a material fact;
- (c) contains any information which cannot be verified; or
- (d) is likely to create an unjustified expectation about the results that can be achieved by the professional.

(3B) In publicising his or her practice, a professional shall ensure that —

- (a) any claim to expertise or specialisation can be justified;
- (b) the publicity does not make any direct or indirect mention of past projects in which, or clients for whom, the professional or any of his or her firm or company had acted where the provision of such information will involve a breach of confidentiality owed to any client or former client; and
- (c) the publicity does not make any comparison or criticism in relation to the quality of the professional services provided by any other professional or allied professional.

(3C) For the purpose of sub-paragraph (3B) (a), the following factors shall be taken into account in justifying any claim to expertise or specialisation:

- (a) academic qualifications;
- (b) experience;
- (c) facilities;
- (d) personnel; and
- (e) capacity to render professional service.

(4) A professional shall refrain from expressing publicly an opinion on an engineering or technological project or product unless the professional is informed of the facts relating thereto.

(5) A professional shall —

- (a) exercise due restraint in criticising the professional work of another professional; and
- (b) not maliciously or recklessly injure or attempt to injure, directly or indirectly, the professional reputation, prospects or business of another professional.

(6) Sub-paragraph (4) shall not affect any moral obligation to expose unethical conduct before the proper authorities or preclude a frank but private appraisal of employees or of professional being considered for employment.

(7) A professional shall not endorse engineering or technological product, system or process in any commercial advertisement.

3. – (1) A professional shall discharge his or her duties to his or her employer or client with complete fidelity.
- (2) A professional shall not accept remuneration for professional services rendered from any person other than his or her employer or client except with the knowledge and approval of his or her employer or client.
- (3) A professional shall not, without disclosing the fact to his or her employer in writing, be a director of or have a substantial financial interest in, or be an agent for, any company, firm or person carrying on any business which is or may be involved in the professional work to which his or her employment relates.
- (4) A professional shall not accept any trade commission, discount, allowance or indirect payment or other consideration in connection with any professional work in which he or she is engaged.
- (5) A professional shall not receive, directly or indirectly, any royalty, gratuity or commission in respect of any patented article or process used in or for the purpose of the professional work in respect of which he or she is acting as a professional for an employer unless and until the receipt of such royalty, gratuity or commission by the professional has been authorised in writing by such employer.
- (6) Subject to the provisions of these Rules, a professional shall not hold, assume or intentionally accept a position in which his or her interest is in conflict with his or her professional duty to his or her client or employer.
- (7) A professional shall not disclose confidential information concerning the business affairs or technical processes of his or her client or employer without the consent of the client or employer.
- (8) A professional shall not use information which is obtained confidentially in the course of his or her assignment for the purpose of making personal profit.
- (9) A professional shall not divulge any confidential findings or studies or actions of an engineering or technical or scientific commission or board of which he or she is a member without the consent of the commission or board.
- (10) A professional shall not give professional advice which does not fully reflect his or her best professional judgment.
- (11) A professional shall engage, or advise engaging, experts and specialists when in his or her opinion and judgment such services are in the interest of his or her client or employer.
4. A professional shall not supply professional services in respect of any project in which he or she is acting as a developer of an engineering work or product that the project is aimed to develop or construct.
5. Notwithstanding the responsibility to his or her employer and to his or her profession, a professional shall act with prime regard to the public interest.
6. A professional shall not knowingly attempt to supplant another professional, nor shall he or she intervene or attempt to intervene in or in connection with professional work of

any kind which to his or her knowledge has already been entrusted to another professional.

7. – (1) A professional shall not knowingly undertake a commission from any person while any claim for compensation or damages or both by another professional previously employed by that person and whose employment has been terminated remains unsatisfied unless security for the due satisfaction of any award or judgment has been given.

(2) The professional previously employed may report the matter to the Board if he or she has reasonable grounds for not being satisfied with the security, and the Board may forbid the first-mentioned professional in sub-paragraph (1) from proceeding with the professional work.

8. A professional shall not canvass or solicit professional employment or offer to make payment for the introduction of such employment.

9. A professional shall not be the medium of any payment made on behalf of his or her employer unless so requested by his or her employer and he or she, in connection with any professional work in which he or she is employed, shall not place any contract or order except with the authority of or on behalf of his or her employer.

10. A professional shall not take part in a competition involving the submission of any proposal and design for professional work unless the assessor to whom such proposal and design is to be submitted for adjudication is a person of acknowledged engineering or technical standing.

11. – (1) A professional who is engaged in the construction or in the design and construction of engineering or technical work or in the manufacture or in the design and manufacture of articles of commerce, whether on his or her own account or as a technical adviser or employee or a partner or director of a firm or company so engaged, shall not prepare or submit to a client or customer or prospective client or prospective customer a design for engineering or technical works or articles unless accompanied by an offer on behalf of himself or his or her firm or company to construct the work or supply the articles, and a proviso that if the design of the professional, the corporation of which he or she is a director or partnership of which he or she is a member is accepted, he or she shall be given the contract for the work or supply of the articles, with such variation (if any) as to design and with such arrangements as to remuneration as may be mutually agreed.

(2) A professional shall not prepare or submit or offer to prepare or submit a design without informing the client or customer or prospective client or prospective customer as to the nature of his or her connection with the construction or manufacture of the work or articles in question.

(3) Except at the request of the client or customer, a professional shall not offer, directly or indirectly, on behalf of himself or his or her firm or company, to design, or to design and construct, any engineering or technical work, the design of which to his or her knowledge has already been entrusted to another professional, who is acting as a consultant, unless with the approval of such professional.

12. A professional shall —

(a) exercise due diligence to ensure that there is no contravention of or failure to comply with any written law by any person in the carrying out of any project or works of which the professional is the consultant or engineer; and

(b) report to the appropriate authority any contravention of or failure to comply with any written law by any person in the carrying out of any project or works of which the professional is the consultant or engineer, if such contravention or failure comes to his or her knowledge.

PART II

1. – (1) A professional shall not use the advantage of a salaried position to compete unfairly with other professionals.

(2) He or she shall not accept any professional commission from persons other than his or her employers to an extent prejudicial to his or her salaried position or detrimental to established professional services or which would result in a conflict of interest.

(3) If permitted by his or her employer any professional commission from persons other than his or her employers shall be confined to consultation on phases of engineering or technology for which he or she has special qualifications not inherently available in usual professional practice, except that he or she shall not establish an office for the purpose of conducting such outside activities.

(4) He or she shall not use the influence of a salaried position to direct clients to another professional, or other engineering or technological firm in which he or she has a financial interest.

2. A professional shall not, for the purpose of obtaining any permit, licence or approval of any public authority, sign any plans or calculations which neither he or she nor any member of his or her staff under his or her supervision verified, checked or prepared.

By
IES Professional Registration Board

ANNEX C: COMPETENCY STANDARDS

CHARACTERISTICS OR INDICATORS OF EACH ELEMENTS OF COMPETENCY STANDARD⁴

	Descriptor	Elements	Characteristics or Indicators
(1)	Comprehend and apply knowledge	Comprehend and apply advanced knowledge of the widely-applied principles underpinning good practice to the local practice	<ul style="list-style-type: none"> • Pursuit of post-graduate study or further learning to broaden knowledge and apply new knowledge • Work done to broaden knowledge of codes, standards and specifications • Work from first principles to make reliable predictions of outcomes • Seek advice, where necessary, to supplement own knowledge and experience • Use evidence from best practice to improve effectiveness
(2)	Problem analysis	Define, investigate and analyse complex problems	<ul style="list-style-type: none"> • Develop specification and procurement of new engineering products, processes and systems • Identify and define the scope of the problem • Investigate and analyse relevant information using quantitative and qualitative techniques • Test analysis for correctness of results • Conduct any necessary research and reach substantiated conclusions

⁴ Adapted from the International Engineering Alliance’s “Graduate Attributes and Professional Competencies

	Descriptor	Elements	Characteristics or Indicators
(3)	Design and develop solutions	Design or develop solutions to complex problems	<ul style="list-style-type: none"> • Develop criteria for evaluating design solution • Identify needs, requirements, constraints and performance criteria • Develop concepts and recommendations that were tested against engineering principles • Evaluate options and selects solution that best matched needs, requirements and criteria • Plan and implement effective, efficient and practical systems or solutions
(4)	Evaluation	Evaluate the outcomes and impacts of complex activities	<ul style="list-style-type: none"> • Evaluate outcomes against original specifications • Learn from feedback on results to improve future design solutions and build best practice • Identify and manage risks through ‘elimination, minimisation and avoidance’ techniques
(5)	Protection of society	Recognise the reasonably foreseeable social, cultural and environmental effects of complex activities generally, and have regard to the need for sustainability; recognise that the protection of society is the highest priority	<ul style="list-style-type: none"> • Develop and implement appropriate hazard identification and risk management systems to manage safety and hazards • Develop and implement environmental impact assessments, or environmental risk assessments • Consider and takes into account possible social, cultural and environmental impacts • Understand and facilitate stakeholder involvement in sustainable development • Recognises impact and long-term effects of engineering activities on the environment
(6)	Legal and regulatory	Meet all legal and regulatory requirements and protect public health and safety in the course of his or her activities	<ul style="list-style-type: none"> • Demonstrate understanding and work within all relevant legislation and regulatory frameworks

	Descriptor	Elements	Characteristics or Indicators
(7)	Ethics	Conduct his or her activities ethically	<ul style="list-style-type: none"> • Demonstrate understanding of and comply with the rules of professional conduct of the IES • Act with integrity and honesty
(8)	Manage engineering activities	Manage part or all of one or more complex activities	<ul style="list-style-type: none"> • Organise and lead work teams, coordinating project activities • Work in cross-disciplinary team involving complex projects • Plan, schedule and organise projects to deliver specified outcomes • Apply appropriate quality assurance techniques • Manage resources, including personnel, finance and physical resource constraints • Manage conflicting demands and expectations • Apply continuous improvement through quality management
(9)	Communication	Communicate clearly with others in the course of his or her activities	<ul style="list-style-type: none"> • Prepare and deliver presentations on strategic matters • Communicate using a range of media suitable to the audience and context • Treat people with respect • Develop empathy and use active listening skills when communicating with others • Operate effectively as a team member
(10)	Lifelong learning	Undertake CPD activities sufficient to maintain and extend his or her competence	<ul style="list-style-type: none"> • Maintain evidence of competence development • Demonstrate a commitment to extending and developing knowledge and skills • Participate in education, training, mentoring or other programmes contributing to professional development • Adapt and update knowledge base in the course of professional practice

	Descriptor	Elements	Characteristics or Indicators
(11)	Judgement	Recognize complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgement in the course of his or her complex activities	<ul style="list-style-type: none"> • Demonstrate ability to identify and choose alternative options and justify decisions • Peer's recognition of ability to exercise sound professional engineering judgement
(12)	Responsibility for decisions	Be responsible for making decisions on part or all of complex activities	<ul style="list-style-type: none"> • Demonstrate understanding of responsibilities involved when making engineering decisions • Take accountability for outputs • Accept responsibility for engineering activities