

APEC ENGINEER ASSESSMENT STATEMENT THAILAND

COUNCIL OF ENGINEERS THAILAND

APEC ENGINEER REGISTER THAILAND ASSESSMENT STATEMENT

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PREFACE

The Council of Engineers (COE) was recognized as an APEC Engineer agreement member in 2003.

This APEC Engineer Assessment Statement June 2016 is published according to the APEC Engineers Agreement (APECEA). The APECEA is set to be an important part of the Competence Agreements which it supersedes the APEC Engineer Framework, commenced in 2000 based on the APEC Engineer Manual.

In accordance with the amendment and the standard requirements for APEC Engineer Register. This Assessment Statement is revised to provide the information on the APEC Engineer register in Thailand assessment.

1. Definition

The definition of key terms is shown in the *Attachment 1*.

2. Introduction

The Council of Engineers (COE), the Thailand statutory body for engineering profession under the Engineer Act B.E. 2542 (1999), has appointed APEC Engineer Monitoring Committee to operate the APEC Engineer register in Thailand. The APEC Engineer Monitoring Committee maintains and coordinates the APEC engineer register using APEC engineer assessment on regulated professional licensed engineers for the qualification equivalent to registered APEC Engineer qualification in APEC member economies.

It is recognized that the APEC Engineer Agreement as constituent of IEA Competence Agreement supersedes the APEC Engineer Framework commenced in 2000.

This revised APEC Engineer assessment statement exhibits the fundamental information on engineering profession and the revised APEC assessment mechanism to meet requirements of APEC Engineer Agreement, with that mechanism; it shall be used as benchmark requirements for assessment mechanism on regulated engineering professional qualification for licensing the Thailand's APEC Engineer.

Objective of APEC Engineer Register

The APEC Engineer register is an initiative for trade liberalization in professional service to facilitate cross border engineering professional practice and mobilization of human resources of APEC participating economies.

The objective of APEC Engineer Register, therefore, is to recognize the equivalent professional qualification and professional competence of engineers in the host/participating economies and to facilitate engineering services between participating economies.

Purpose of Assessment Statement

The purpose of assessment statement is to provide a framework for evaluation of qualification of professional engineer candidate who acquires for APEC engineer certification from APEC Engineer Register, Thailand. Consequently to the revision of assessment statement, the Council of Engineers rules and regulations, in conjunction with APEC Engineer assessment of professional qualification, then shall be revised to conform to benchmark requirements prescribed in APEC Engineer Agreement.

PART A - THAILAND APEC ENGINEER MONITORING COMMITTEE

Thailand APEC Engineer Monitoring Committee is appointed by Board of the Council of Engineers to operate on APEC Engineer register. The Monitoring Committee members shall be renewed every 3 year-period conforming to the 3 years term of elected Board of the Council of Engineers. The member committee is nominated from various operational groups within the Council of Engineers. They also represent regulated fields of professional practice.

1. Roles and Responsibilities of the Monitoring Committee are as following;

- 1) Coordinating to COE secretariat for setting up assessment criteria and registration procedure of APEC Engineers in Thailand.
- 2) Assessment of APEC Engineers candidates in Thailand
- 3) Promoting the registration of APEC Engineers in Thailand

2. Membership

The APEC Engineer Monitoring Committee members (from December 2016 to December 2018) are listed as following;

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1) Mr. Karoon	Chandrangsu	Past, The 1st Vice President of the Council
		of Engineers

Past, Chair of APEC Engineer and ASEAN

Chartered Professional Engineer

Monitoring Committee

2) Mr. Kecha Thirakomen Past, Secretary-General of the Council of

Engineers

Committee Members

1) Chair: Mr. Krai Tungsanga The 1st Vice President of the Council of Engineers

Chair, Sub-Committee on Foreign Affairs

2) Mr. Prasert Tapaneeyangkul The 2nd Vice President of the Council of Engineers

Chair, Sub-Committee of Legal Affairs

3) Mr. Damrong Thawesaengskulthai Council Board Member

Chair, Sub-Committee of

Continuing Professional Development

APEC Engineer Assessment Statement August 2016

4) Mr. Luachai Thongnil Council Board Member

Chair, Sub-Committee of Senior Professional

and Professional Engineer, Electrical

Engineering

5) Mr. Manit Koothanapath Council Board Member

Chair, Sub-Committee of Recognition Mechanical Engineering Degree

6) Mr. Piyabutr Wanichpongpan Council Board Member

Chair, Sub-Committee of Recognition Chemical

Engineering Degree

7) Mr. Sarithdej Pathanasethpong Council Board Member

Chair, Sub-Committee of Thailand

Accreditation Board of Engineering Education

(TABEE)

8) Mr. Ekasit Limsuwan Advisor, Sub-Committee of Professional

Practice; and

Advisor, Sub-Committee of Educational

Qualification

3. Monitoring Committee Chart



Mr. Krai Tungsanga Chairman



Mr. Karoon Chandrangsu Advisor



Mr. Kecha Thirakomen Advisor



Mr. Prasert Tapaneeyangkul Member



Mr. Damrong Thawesaengskulthai Member



Mr. Luachai Thongnil Member



Mr. Manit Koothanapath Member



Mr. Piyabutr Wanichpongpan Member



Mr. Sarithdej Pathanasethpong Member



Mr. Ekasit Limsuwan Member

4. Contact Persons

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PART B - ASSESSMENT MECHANISMS

Referring to APEC Engineers Agreement (APECEA) requirements, APEC Engineer candidate shall be qualified for assessment of the benchmark competence standards including:

- 1) an overall level of academic achievement conforming to requirements of the Council of Engineers, or other equivalent recognition for the regulated engineering profession licensing in Thailand;
- 2) the professional engineering competence for independent practice as provided in the competency profile prescribed by the Council of Engineers, Thailand:
- 3) a minimum period of seven years practical experience since graduation;
- 4) a minimum period of two years in responsible charge of significant engineering work;
- 5) sufficient continuing professional development to maintain professional knowledge and skills;
- 6) holding the regulated engineering professional license, issued by the Council of Engineers and never been penalized for misconduct on professional code of ethics; and
- 7) Individual accountability for his/her professional practices. The candidate is requested to declare his/her professional qualification in the application form. The APEC Engineer Monitoring Committee will review the documents and verify the candidate's professional qualification with an interview.

1. Accreditation or Recognition of Higher Education on Engineering Programs

1A. Assessment Mechanisms

All higher education programs in Thailand are regulated under Ministerial Regulations imposed by the Office of Higher Education Commission, Minister of Education. They are

- 1) National Qualification Framework for Higher Education in Thailand (NQF-HEd).
- 2) Internal Quality Assurance for Higher Education Institutions (IQA).

The National Qualification Framework for Higher Education in Thailand (NQF-HEd), this ministerial regulation mandates, referring to program degree level 2, bachelor degree, that all educational program are required to meet the following requirements.

1) The curriculum shall have minimum program credits ranging from 120 credits for 4 years program, 150 credits for 5 years program, and 180 credits for 6 years program based on bi-semester education system.

- 2) Expected student learning outcomes of the education program are described into 5 learning domains. In each of the learning outcomes domain, there is an increase in the scale or complexity of the learning that is expected for each and different educational disciplines. The domains are;
 - Ethical and Moral Development:
 - Knowledge, the ability to understand, recall and present information including:
 - Cognitive skills,
 - Interpersonal skills and responsibility,
 - Analytical and communication skills.
- 3) Characteristics of graduates at level 2, typically holders of a bachelor's degree, will have demonstrated:
 - Knowledge of a comprehensive, coherent and systematic body of knowledge in a field of enquiry and of the underlying theories and principles associated with it;
 - The ability to investigate complex problems and develop creative solutions with limited guidance, using insights from their own and other related fields of study;
 - The ability to identify and use appropriate mathematical and statistical techniques in the analysis and resolution of complex issues, and select and use the most appropriate mechanisms for communicating the results to a variety of audiences;
 - In the case of a professional program the full range of knowledge and skill required for effective practice in the profession concerned;
 - In the case of an academic program not geared to professional practice, in depth knowledge and understanding of research literature in a field, and ability to interpret, analyze and evaluate the significance of that research in extending knowledge in the field.

Well educated graduates from a bachelor degree program should:

- Take initiative in identifying and resolving problems and issues both individually and in group situations exercising leadership in pursuit of innovative and practical solutions;
- Apply the theoretical insights and methods of inquiry from their field of study in considering issues and problems in other contexts;
- Recognize the provisional nature of knowledge in their field and take this into account in investigating and proposing solutions to academic or professional issues;
- Participate in activities to keep up to date with developments in their field and enhance their own knowledge and understanding;

• Consistently demonstrate a high level of ethical and responsible behavior in academic, professional and community environments

The Office of Higher Education Commission (OHEC) requires that all educational institutions shall have quality assurance conforming to the Internal Quality

Assurance for Higher Education Institutions (IQA) Manual. This quality assurance basically require the educational institutes to maintain educational quality on 9 quality components and report to The Office of Higher Education Commission on performance indicators specified within each of the components. Alternatively, the quality assurance system may be superseded by institutions preferred international recognition of quality education.

The quality components are;

Component 1: Philosophy, Commitments, Objectives and Implementation plans. This component has 2 indicators:

- 1) An identification of philosophy or vision followed by strategies and implementation plans. Indicators should be set up to observe the progress of these plans.
- 2) The percentage of attaining indicators stated for each plan.

Component 2: Teaching and Learning. This component has 13 indicators:

- 1) A system and mechanism for curriculum development and management,
- 2) A learning process that emphasizes on learner.
- 3) Projects or activities to support the curriculum development and learning process that allows individual, organization and external community to participate.
- 4) The Proportion of the number of full-time equivalent students to the number of full-time faculty.
- 5) The proportion of the number of full-time faculty holding bachelor, master and doctoral degrees or equivalent to the number of full-time faculty.
- 6) The proportion of the number of full-time faculty holding the position of instructor, assistant professor, associate professor, and professor to the number of full-time faculty.
- 7) A mechanism to promote the ethical professional practices among faculty.
- 8) A mechanism to promote research for teaching and learning development among full-time faculty
- 9) Percentage of bachelor graduates who can secure jobs and who can be selfemployed within one year
- 10) Percentage of bachelor graduates receiving starting salaries in accord with the standardized scale

- 11) Level of satisfaction of the employers business operators and graduate users
- 12) The percentage of students or alumni who have graduated within 5 years who are granted award in term of academic, professional, morality, ethics, sport, health, art and culture, or environment at the national or international level.
- 13) The percentage of full-time faculties who are really function as thesis advisors in proportion to the number of those who are qualified (only for institutions that emphasize on producing graduates and research)

Component 3: Student Development Activities This component has 2 indicators:

- 1) Services offered to students and alumni.
- 2) Supports for student activities that are complete and conform to preferred Characteristics of graduates

Component 4: Research. This component has 5 indicators:

- 1) A development of systems and mechanisms to support the conduct of research and innovations.
- 2) A knowledge management system for research and innovations.
- 3) The amount of internal and external grants for research and innovations in proportion to the number of full-time faculty.
- 4) The percentage of research and innovations published or registered as intellectual property or patented or utilized at the national or international level in proportion to the number of full-time faculty.
- 5) The Percentage of research articles cited in the refereed journals or the national or international databases in proportion to the number of full-time faculty. (only for institutions that emphasize on producing graduates and research).

Component 5: Academic Services to the Community. This component has 5 indicators:

- 1) Processes and mechanisms to provide academic services to the society mentioned in the objectives of the institution.
- 2) The percentage of full-time faculty who are involved in providing academic services as consultants, thesis committees outside the institution, academic or professional committees at the national or international level in proportion to the number of full-time faculty.
- 3) The percentage of academic and professional service activities/projects responding to the needs for development and strengthening the society, community, nation and the international community in proportion to the number of full-time faculty.

- 4) The percentage of satisfaction levels of those who receive services from the institution.
- 5) The number of academic and professional service centers nationally or internationally recognized. (only for institutions that emphasize on producing graduates and social development).

Component 6: Preservation of Arts and Culture. This component has 3 indicators:

- 1) A process and mechanism for the preservation of arts and culture.
- 2) Pieces of work/accomplishments resulting from knowledge-building and standard-setting for art and culture. (only for institutions that emphasize on producing graduates and developing and promoting arts and culture).
- 3) Effectiveness in the preservation, enhancement and promotion of artistic and cultural identity. (only for institutions that emphasize on producing graduates and developing and promoting arts and culture).

Component 7: Administration and Management. This component has 9 indicators:

- 1) The institution council exhibits good governance and drive the institution to compete in international level.
- 2) The exhibition of leadership among administrators in all levels.
- 3) Institution development for transformation into a learning organization.
- 4) A human resources system and mechanism to develop and maintain qualify and efficient human resources.
- 5) Effectiveness of the database system for teaching and learning and research activities.
- 6) The level of achievement in allowing external individual to participate in the institution's development.
- 7) The percentage of full-time faculty who received academic or professional awards at the national and international level.
- 8) An implementation of risk management programs in the education management.
 - 9) The level of achievement to convey organizational indicators and targets to the individual level.

Component 8: Finance and Budgeting. This component has 2 indicators:

- 1) A system and mechanism to allocate and analyze expenses and audit finance and budgeting efficiently.
- 2) Internal and external sharing of resources.

Component 9: Systems and Mechanism for Quality Assurance. This component has 3 indicators:

- 1) A system and mechanism for internal quality assurance infused as one part of the education management process.
- 2) A system and mechanism to share knowledge and skills relevant to quality assurance to the students.
- 3) The level of achievement of the internal quality assurance program.

Superimposing on the bachelor of engineering degree program, particular to the regulated engineering disciplines, the Regulation on Recognition of Engineering Degree Qualification, is operated by the Sub-Committee for Educational Qualification, the Council of Engineers. This regulation further requires the engineering program of the regulated engineering disciplines namely; civil engineering, electrical engineering, mechanical engineering, industrial engineering, mining engineering, chemical engineering, and environmental engineering, to meet basic requirements as following;

The criteria are briefly described as following;

- 1) Curriculum structure; consists of courses in basic sciences, basic engineering and specific engineering. The combined academic credit for basic engineering and specific engineering subjects are not less than 84 credits, with not less than 24 credits for specific engineering subject and not less than 24 credits for basic sciences and engineering subjects. Detail of engineering course and course description is required to conform to the criteria and procedure for degree recognition.
- 2) Program student admission is regulated by institutional announcement for program admission.
- 3) Faculty Staff, the program shall have at least 3 full time lecturers with academic and professional qualification responsible for program management and program teaching. The faculty to student ratio is not more than 1:20. The program is required to have at least 2 assistant lecturers with academic qualification at least higher level technical program certificate.
- 4) Classroom/ laboratory and equipment and information technology system; the program should provide sufficient classroom, laboratory and equipment and information technology system as specified in engineering program guideline.

The program assessment for recognition of engineering degree program (demonstrated in workflow diagram is described in <u>Attachment 2</u>) consists of;

- 1) Program Self Study Report is required to submit for Sub-committee document review. Additional program/ curriculum clarification is required, if they are needed.
- 2) 1 Day Program visit is arranged to verify the existence and utilization of laboratory equipment and program infrastructure.
- 3) Evaluation report is prepared by the evaluator for the Sub-committee to recommend for Council of Engineers Board approval.

1B. Alternative Assessment Mechanisms

Alternative to the recognition of engineering degree of the regulated engineering profession, the Council of Engineers with approval of the Council of Engineers' general assembly on April 8th, 2015, the accreditation of engineering program is provided as an alternative mechanism for recognition of engineering program quality. The guideline document for rule and procedure for accreditation of engineering program is demonstrated as *Attachment 3*.

Any candidates who do not have education qualification as described in Section 1A and Section 1B, are subjected to individual APEC Engineer qualification review by a reviewing team appointed by recommendation of Monitoring Committee.

2. Assessment for Licensing of Regulated Professional Engineer

Licensing of regulated professional engineer in Thailand is operated by The Council of Engineers, rules and regulations on related field of engineering profession. After graduation from recognized engineering degree program, an engineering degree graduate is eligible to apply for engineering professional license. The candidate has to be assessed through various processes within the Council of Engineers. The application for regulated engineering profession license is shown in *Attachment 4*. The activities are briefly described below;

- The candidate for regulated professional license is required take a series of examinations and training workshop in accordance with COE Regulation on Training and Academic Proficiency Examination for Regulated Professional Readiness. The assessment activities will be carried out by the Subcommittee on Academic Proficiency Examination and Training for Professional Readiness as following;
 - An academic proficiency examination. This examination is a computer based examination on 4 compulsory subjects on basic engineering and 4 selected subjects on specific engineering. (list of examination subjects are described in <u>Attachment 5</u>). The candidate shall attain 60% passing score.

- The regulated professional readiness training workshops. This workshop covers various aspects of professional practices including engineering skill, safety, professional ethics, related law and regulations, and environment. The candidate shall obtain not less than 80% attendance and attain 60% passing score on written examination after attending the workshop. The re-examination will be arranged within 90 days for those who do not pass the examination.
- 2) Upon the completion of academic proficiency examination and training for professional readiness workshops, is granted a regulated engineering professional license. The regulated engineering professional license is issued as associate engineer level license which allows the licensee to have a limited practice of engineering profession in accordance with the related field of regulated engineering discipline as described in COE regulation on qualification and criteria for each level of professional license.

 The procedure of application for associate engineer level license is shown in *Attachment 6*.
- 3) Assessment on professional competence of professional engineer level license. With at least 3 year of professional practice, a professional licensee ranked as associate engineer level is eligible to apply for professional engineer level license. The professional qualification based on candidate's professional competence on engineering works experience will be individually assessed by COE appointed expertise work group on related field of engineering profession. The candidates obtaining not less than 70% score, will be recommended for COE approval for professional engineer level of professional license. The licensee at this level is practically eligible to practice most of engineering profession as described in COE regulation on qualification and criteria for each level of professional license. The procedure of application for professional engineer level license is shown in Attachment 7.
- 4) Assessment on professional competence of senior professional engineer level license. After at least 5 years of practice at professional engineer level, professional engineer level licensee, then, is eligible to apply for senior professional engineer level of professional license. The professional qualification based on professional competence on engineering works experience will be individually assessed by COE and appointed expertise work group on related field of engineering profession at senior professional engineer level. The candidates obtaining not less than 60% score, will be recommended for COE approval for senior professional engineer level of professional license. The senior professional engineer licensee is practically

eligible to have unlimited practice of engineering profession as described in COE regulation on qualification and criteria for each level of professional license. The procedure of application for senior professional engineer level license is shown in *Attachment 8*.

5) A person who has a bachelor's degree in engineering or equivalent and wishes to obtain the regulated engineering provisional license, with specific scope of work in compliance with Adjunct Engineer license under the Engineer Act B.E. 2542 (1999), shall pass the interview and academic proficiency examination for regulated professional readiness. The procedure of application for adjunct engineer license is shown in <u>Attachment 9</u>.

Level of Engineering Professional License

As they are subjected to Engineer Act B.E. 2542 (1999) Chapter 6, Section 46, the regulated professional engineer is classified into 4 levels of professional license as follows;

- 1) Senior Professional Engineer
- 2) Professional Engineer
- 3) Associate Engineer (Engineering-in-Training)
- 4) Adjunct Engineer

Each of professional licenses is limited by scope of regulated field of engineering profession work in accordance with COE Regulation on Qualification and Criteria for each level of professional license.

Continuing Professional Development

The COE Regulation on Continuing Professional Development B.E. 2551 (2008), recognize and utilize CPD point within context of engineering professional practice in Thailand. The objectives of continuing professional development are;

- 1) To be used as an assessment component for professional engineer level license.
- 2) To upgrade knowledge contents and professional competence of regulated engineering professional licensee.
- 3) To promote and support the regulated engineering professional licensee in continuous development of knowledge and professional competence.
- 4) To promote and support academic training, workshop, or research and development which benefit to CPD.
- 5) To use and knowledge information and experience transfer among the regulated engineering professional licensee.
- 6) To promote and support confidence in professional services.

The CPD scope and activities is described in *Attachment 10*.

3. Assessment on APEC Engineer Register

APEC Engineer candidate through the application is required to have qualification and competence assessment by qualification reviewing team appointed by APEC Engineer Monitoring Committee, <u>Attachment 11</u>. The criteria for APEC Engineer candidate's qualification and competence assessment are as following;

- 1) **An Academic Qualification** conforming to requirements of the Council of Engineers, Thailand, or other equivalent recognition for the regulated engineering profession licensing in Thailand, the detail of which is described in Part A Section 1 Recognition of higher education on engineering programs;
- 2) Being an engineering professional licensee at professional engineer or senior professional engineer. The candidate shall be COE professional licensee and has been assessed for the professional engineering competence by the Council of Engineers, Thailand, as prescribed in Part B section 2 (Assessment for Licensing of Regulated Professional Engineer);
- 3) A minimum period of seven years practical experience since graduation, assessment and interview is based on candidate's experience profile and verified documents and work reports declared by the candidate attaching with the APEC Engineer application. The 7 years experiences shall be conforming to COE regulation on qualification and criteria for each level of professional license. IEA competence for independent practice is candidate additional requirement attach to the application; and
- 4) A minimum period of two years in responsible charge of significant engineering work. The significant engineering work is considered that the candidate shall have at least 2 years in position to have continuous practice engineering work as described in Ministerial Regulation on Engineering Profession and Regulated Engineering Profession engineering work. They are as follows;
 - **Engineering Consultancy,** including recommendation, investigation and verification of engineering practice.
 - **Project Planning**, including studying and analysis for project alternatives or project planning.
 - **Engineering Design and Calculations,** including construction detail, construction, production or plant layout which describes in detail of calculation, drawing, specification, and cost estimation.
 - **Construction and Production Supervision,** including operating or supervision on construction project, production, manufacturing, installation, reparation, modification, project decommissioning or

- mobilization of engineering, in accordance with drawing and specifications.
- **Investigation**, including assessment, research, analysis, testing, data sampling and statistical information for professional investigation, judgement, or verification.
- **Operation and Maintenance Supervision,** including operating and maintaining an engineering work/system in accordance with engineering design and specifications.
- 5) **Satisfactory Continuing Professional Development**. The candidate shall attain at least 50 points at entry level and with average 50 points or 50 points per year over the past 3 years CPD record; and
- 6) **Compliance with Code of Ethics and/or Code of Conduct.** The candidate shall have the regulated engineering professional or senior regulated engineering professional license, issued by the Council of Engineers and never been penalized for misconduct on professional code of ethics as described in *Attachment 12*.

4. Renewal of APEC Engineer Certification

APEC Engineer is required to renew APEC Engineer registration on 3-year basis. Each renewal documents shall be submitted together with updated curriculum vitae' and record of continuing professional development as prescribed requirement.

The APEC Engineer is required to have CPD point at least 50 points per year or 150 points over 3 years to satisfy the renewal of APEC Engineer registration. <u>Attachment 13</u>

PART C - ENGINEERING DISCIPLINES

The regulated fields of engineering professions in accordance with the Engineer Act B.E. 2542 (1999) are listed as follows;

- 1) Civil Engineering
- 2) Electrical Engineering
- 3) Mechanical Engineering
- 4) Industrial Engineering
- 5) Mining Engineering
- 6) Chemical Engineering
- 7) Environmental Engineering

In addition to the seven regulated engineering disciplines, the engineering field of specialization may be further categorized as engineering sub-disciplines and technical specialization.

Regulated Engineering	Regulated Engineering
Disciplines	Sub-Disciplines/Technical Specialization
1. Civil Engineering	
2. Electrical Engineering	Power
	Telecommunication
3. Mechanical Engineering	
4. Industrial Engineering	
5. Mining Engineering	Mining Engineering
	Metallurgical Engineering
6. Chemical Engineering	
7. Environmental Engineering	

Part D - References and Attachments

The following should be attached to the Assessment Statement

- 1. Attachment 1 Definition
- 2. Attachment 2 Workflow: The Program Assessment for Recognition of Engineering Degree Program
- 3. Attachment 3 Rule and Procedure for Accreditation of Engineering Program
- 4. Attachment 4 Application for Regulated Engineering Profession License Mechanism
- 5. Attachment 5 List of Examination Subjects
- 6. Attachment 6 Application for Associate Engineer License
- 7. Attachment 7 Application for Professional Engineer License
- 8. Attachment 8 Application for Senior Professional Engineer License
- 9. Attachment 9 Application for Adjunct Engineer License
- 10. Attachment 10 Continuing Professional Development (CPD)
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- 12. Attachment 12 Code of Ethics for Engineering Profession
- 13. Attachment 13 APEC Engineer Renewal
- 14. Attachment 14 APEC Engineer Application Form

Attachment 1

Definition

Adjunct Engineer

A level of engineering professional license granted to COE member and expatriate for specific area of engineering practice and limited scope of engineering work.

Associate Engineer

of starting level engineering professional license granted engineering graduates from recognized engineering degree on regulated engineering disciplines. Upon granting of associate engineer license, the license applicant must pass the academic proficiency examination and workshop on professional readiness. The associate engineer licensee is permitted to practice engineering profession with limited scope of work in accordance with COE regulation on level of engineering professional license.

Code of practice

A document, not normally having the force of law, that provide guidance on management or other practices to be adopted in implementing the principles of professional Codes of Conduct and other regulations.

Continuing Professional Development

Engineering professional development activities taking place after graduation. The activities include attending professional short courses, trainings and other activities which have the objects and contents for maintaining or developing professional competency of the regulated engineering profession licensee.

CPD Unit, Continuing Professional

Development Units, PDU

Unit points of the continuing professional development activities as recognized by the Council of Engineers.

Council Board Members

The members of the Board of the Council of Engineers.

Engineering professions

Engineering professions in the fields of civil engineering, mining engineering, mechanical engineering, electrical engineering, industrial engineering, chemical engineering, environmental engineering and other fields of engineering as listed in ministerial regulations.

Members

Individual and/or juridical members of the Council of Engineers.

Regulated engineering profession

The engineering professions as listed in ministerial regulation that requires engineering professional license for purposes of publics safety, engineering professional practices and professional ethics.

Regulated engineering profession practitioner

Engineering professional licensee for practicing Regulated engineering professions issued by the Council of Engineers.

Responsible work in regulated engineering professions

The engineering works as prescribed in the Ministerial regulation: prescribing fields of engineering professions and regulated engineering professions B.E. 2550 (2007).

Sub-committee

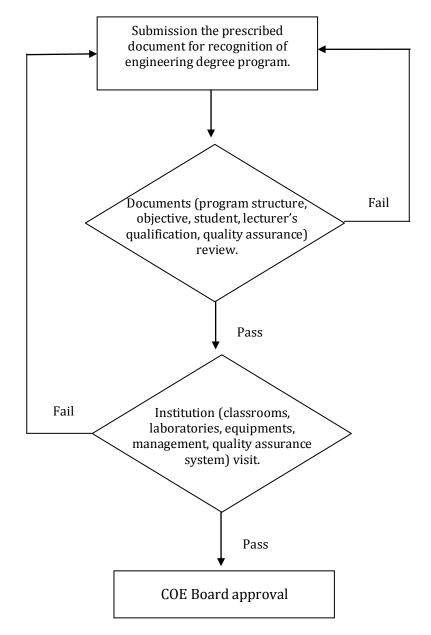
A functional group, chaired by a COE board member, to operate on

designated COE objectives and functions, or else to operate on certain COE regulation.

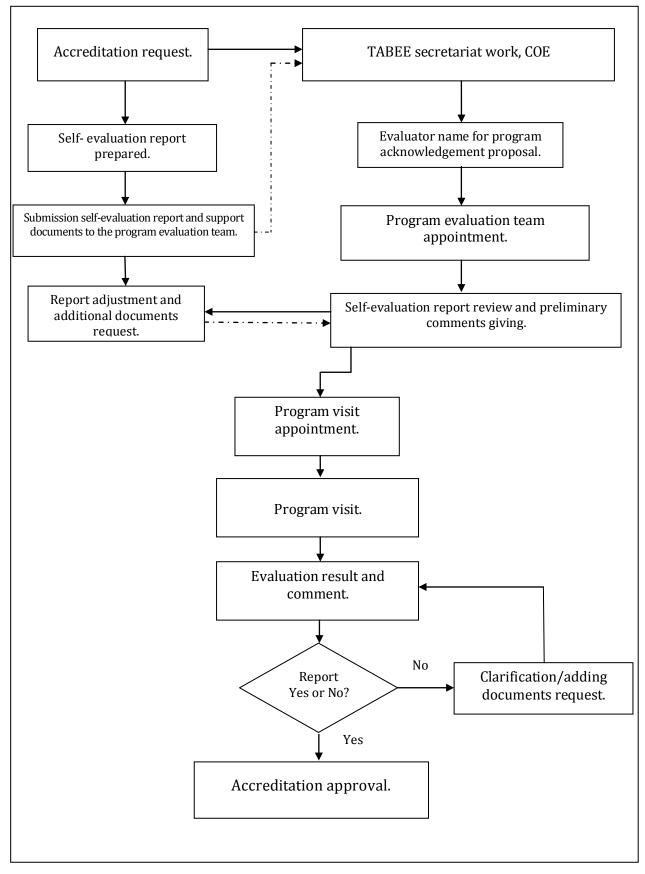
Sub-discipline

A generally-recognized, major subdivision of engineering such as the traditional disciplines of Chemical, Civil, or Electrical Engineering, or a cross-disciplinary field of comparable breadth including combinations of engineering fields, for example Mechatronics, and the application of engineering in other fields, for example Bio-Medical Engineering.

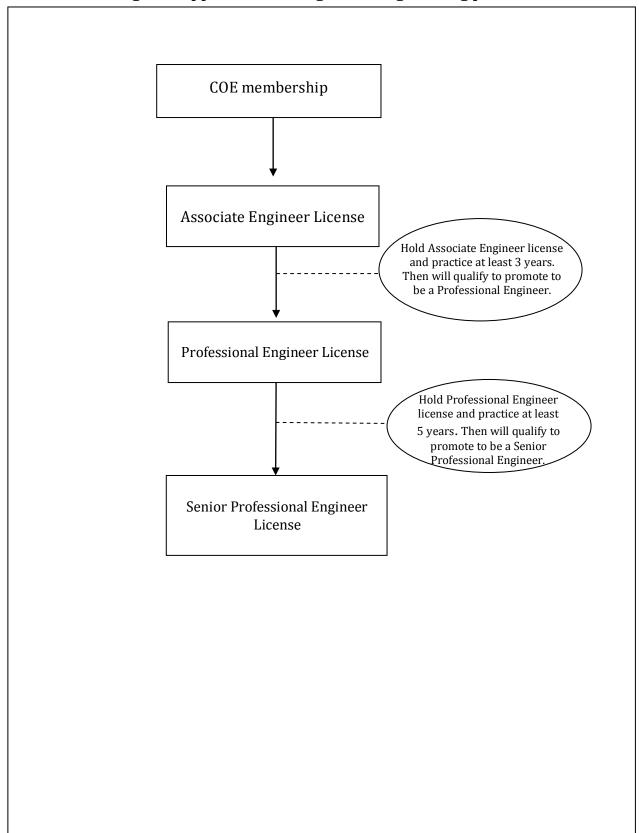
 $\frac{Attachment\ 2}{\text{Workflow diagram: The program assessment for recognition of}}$ engineering degree program



 ${\it Attachment~3}$ Workflow diagram: Procedures for Accreditation of Engineering Program



 ${\it Attachment~4} \\$ Workflow diagram: Application for regulated engineering profession license



<u>Attachment 5</u>

List of Examination Subjects

No.	Discipline	Basic subjects	Specific subjects
1	Civil Engineering	Engineering	Structural Analysis
		Drawing	Reinforced Concrete
		 Engineering 	Design & Practice
		Mechanics	 Soil Mechanics +
		 Engineering 	Laboratory
		Materials	 Civil Engineering Materials
		• Computer	and Testing
		Programming	 Steel & Timber Design &
		 Applied 	Practice/ Foundation
		Mathematic/	Engineering & Practice
		Differential	 Hydraulic Engineering /
		Equations	Water Resources
		 Strength of Materials 	Engineering
		or Mechanics of	Highway Engineering/
		Materials	Transportation
		• Fluid	Engineering
		Mechanics/Hydrauli	 Construction Engineering
		cs & Laboratory	and Management/ Route
		• Surveying & Field	Surveying/
		Camp (80 Hours)	Photogrammetry
2	Mining Engineering	Mining	Mining
	• Mining	• Engineering	Surface Mining and Mine
	 Metallurgical 	Drawing	Design
		• Engineering	Underground Mining and
		Mechanics	Mine Design
		• Engineering	Mine Economics
		Materials	Geotechniques/ Blasting
		• Computer	Technology
		Programming	General Geology/ Ghaving a SM and a large
		• Thermodynamics/	Chemistry of Materials/
		Thermodynamics of	Material Characterization
		Materials • Mechanics of	Mineral Processing I
		• Mechanics of Materials	Mineral Processing II/ Separation Technology
		Fluid Mechanics	Separation Technology
		Fundamental of	 Mine Planning and Design/ Geostatistics/
		Electrical	Georesources
		Engineering	Environmental and
		Metallurgical	Pollution Prevention
		• Engineering	1 onudon i revendon
	1	- Linginica ing	
		Drawing	Metallurgical
		Drawing • Engineering	Metallurgical ■ Chemical Metallurgy

		 Engineering Materials Computer Programming Thermodynamics/ Thermodynamics of Materials Mechanics of Materials Transport Phenomena Fundamental of Electrical Engineering 	 Materials Failure Analysis Physical Metallurgy Materials Characterization Metal Forming Metallurgy of Metal Joining/ Materials Selection / Materials Selection and Design Corrosion of Metals
3	Mechanical Engineering	 Engineering Drawing Engineering Mechanics Engineering Materials Computer Programming Thermodynamics Fluid Mechanics Strength of Materials or Mechanics of Materials Manufacturing Process 	 Mechanical Engineering Mechanics of Machinery Machine Design or Mechanical Design Automatic Control/ Digital Control / Fluid Power Control / Dynamics of Systems and Control Internal Combustion Engines / Combustion Mechanical Vibration Air Conditioning / Refrigeration / Refrigeration and Air - Conditioning Heat Transfer / Heat and Mass Transfer / Thermal System Design Power Plant Engineering / Power Generation and Environment Agriculture / Agricultural Machines Mechanics of Machinery / Theory of Agricultural Machines Machine Design or Mechanical Design / Agricultural Machinery Design Automatic Control / Digital Control / Fluid Power

	Control/ Fluid Power Control for Agricultural Engineering Mechanical Vibration/ Vibration for Agricultural Engineering Internal Combustion Engines/ Combustion/ Internal Combustion Engines for Agricultural systems Air Conditioning/ Refrigeration/ Industrial Refrigeration, Freezing, Cold Storage /Refrigeration and Cold Storage Systems Heat Transfer/ Heat and Mass Transfer/ Thermal Systems Design Power Plant Engineering/ Power for A Mechanics of Machinery / Dynamics of Vehicles Machine Design or Mechanical Design Automatic Control/ Automotive Control Mechanical Vibration Internal Combustion Engines/ Combustion Engines/ Combustion Heat Transfer Power Plant Engineering
	 Heat Transfer Power Plant Engineering
	 Food Mechanics of Machinery /Mechanics of Food Machinery Machine Design or Mechanical Design/ Design of Food Machinery Automatic Control / Food Process Control Mechanical Vibration for Food Engineer Internal Combustion

Engines/ Combustion/ Combustion Technology for Food Engineering Refrigeration/ Industrial Technology for Food Engineering Heat Transfer/ Heat and Mass Transfer/ Thermal System Design Power Systems in Food Industry
Naval Architecture Mechanics of Machinery/ Ship Dynamic/ Ship Buoyancy and Stability Machine Design or Mechanical Design/ Ship Design Automatic Control/ Digital Control / Fluid Power Control Mechanical Vibration/ Ship Vibration Internal Combustion Engines/ Combustion Air Conditioning/ Refrigeration Heat Transfer/ Heat and
Mass Transfer/ Thermal System Design • Power Plant Engineering/ Ship Propulsion and Engines/ Ship Resistant and Powering
 Aerospace Mechanics of Machinery/ Mechanics of Flight Machine Design/ Aircraft Design Automatic Control/ Digital Control/ Automatic Flight Control Mechanical Vibration Internal Combustion Engines/ Combustion

			 Air Conditioning/ Aircraft Air Conditioning and Pressurization Systems Heat Transfer/ Heat and Mass Transfer/ Thermal System Design Aircraft Power Plant/ Aerospace Propulsion
			 Mechatronics Mechanics of Machinery/ Dynamic of Robotics Machine Design or Mechanical Design/ Mechatronics Design Automatic Control/ Digital Control/ Fluid Power Control Mechanical Vibration Internal Combustion Engines/ Combustion Air Conditioning/ Refrigeration/ Refrigeration and Air Conditioning Heat Transfer/ Heat and Mass Transfer/ Thermal System Design Power Plant Engineering
4	Electrical Engineering • Power • Telecommunication	 Engineering Drawing Engineering Mechanics Engineering Materials Computer Programming Electric Circuits Engineering Electronics Electromagnetic Fields Control Systems 	 Power Electrical Instruments and Measurements Electrical Machines Electrical System Design Electrical Power System Analysis Power Plant and Substation/ Electrical Power Generation, Transmission and Distribution Power System Protection High Voltage Engineering/ Electrical Engineering Materials Power Electronics

Energy

- Electrical Instruments and Measurements
- Electrical Machines
- Electrical System Design
- Electrical Power System Analysis
- Thermal Sciences
- Distributed Generation Systems
- Renewable Energy
- Energy Conservation and Management

Control and Measurement Systems and Mechatronics

- Electrical Instruments and Measurements
- Electrical Machines
- Electrical System Design
- Electrical Power System Analysis
- Electrical Power Generation, Transmission and Distribution
- Microprocessors/ Computer Systems and Interfacing
- Process Instrumentation/ Industrial Sensors and Control Devices
- Instrumentation System
 Design/ Industrial
 Automation System /
 Electric
 Drives

<u>Telecommunication</u>

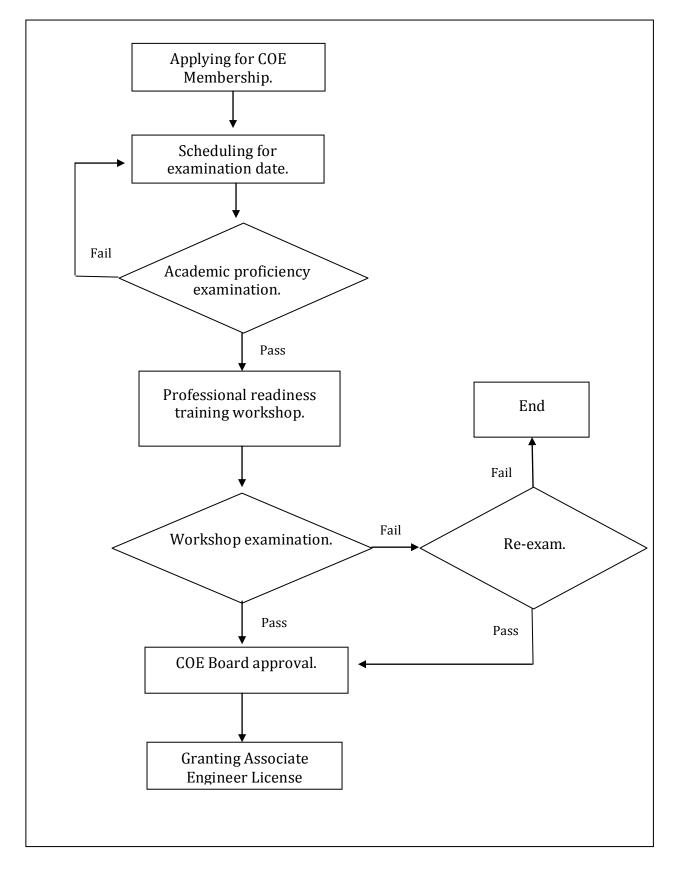
- Electrical Instruments and Measurements
- Principles of Communication
- Communication Network and Transmission Lines/ Signal and Systems
- Digital Communication

5	Industrial Engineering	 Engineering Drawing Engineering Mechanics Engineering Materials Computer Programming Engineering Statistics or Probability and Statistics 	 Data Communication and Networking Optical Communication Microwave Engineering Antenna Engineering Industrial Safety Engineering Industrial Plant Design Production Planning and Control Quality Control Industrial Work Study Operations Research Engineering Economy Material
		Statistics • Manufacturing Processes • Thermodynamics/ Thermodynamics of Materials/ Themofluids • Fundamental of Electrical Engineering	 Material Safety Engineering Industrial Plant Design Production Planning and Control Quality Control Mechanical Behavior of Materials Deterioration of Materials Materials Characterization Materials Selection and Design
			 Production Safety Engineering Industrial Plant Design Production Planning and Control Quality Control Tool Engineering Machine Tools Forming Processes Automation and Control Systems
			 Logistics Safety Engineering Industrial Plant Design Production Planning and Control Quality Control

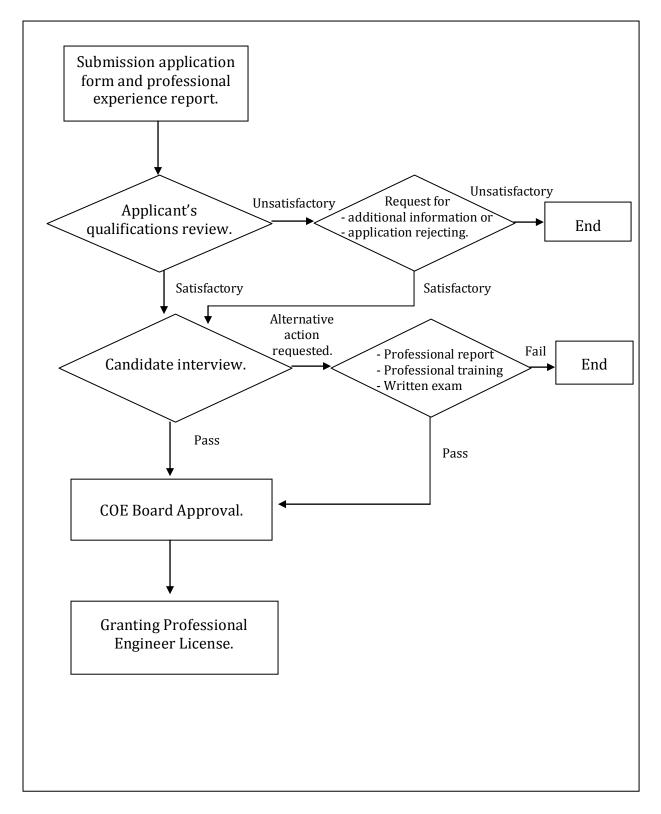
			 Inventory and Warehouse Management Logistics and Supply Chain Management Transportation and Distribution Material Handling System Design Mechatronics Safety Engineering Industrial Plant Design Production Planning and Control Quality Control Manufacturing Automation Industrial Robotics and Machine Vision Computer Systems and Interfacing Modeling and Interfacing
			 Modeling and Control Systems
6	Environmental Engineering	 Engineering Drawing Engineering Mechanics Engineering Materials Computer Programming Chemistry for Environmental Engineering/ Biology for Environmental Engineering Strength of Materials/ Surveying/ Hydrology Fluid Mechanics/ Hydraulics Environmental Unit Operations/ Environmental Unit Processes/ 	 Water Supply Engineering/ Water Works Design/ Advanced Water Treatment Wastewater Engineering/ Wastewater Engineering Design/ Industrial Water Pollution Control/ Advanced Wastewater Treatment Solid Waste Engineering Air Pollution Control/

		Biological Unit Processes	Waste Treatment • Environmental Health Engineering/ Water Resource Management/ Environment and Energy/ Computer Application in Environmental Engineering/ Construction Management for Environmental Engineering/ Environmental Modeling
7	Chemical Engineering	 Engineering Drawing Engineering Mechanics Engineering Materials Computer Programming Engineering Statistics or Probability and Statistics/ Experimental Design Chemical Engineering Processes/ Chemical Engineering Principle and Calculation Thermodynamics/ Physical Chemistry Fundamental of Electrical Engineering/ Chemical Process Instrumentation 	 Chemical Engineering Kinetics and Reactor Design Process Dynamics and Control Fluid Flow Heat Transfer and Mass Transfer Chemical Engineering Plant Design Safety in Chemical Operation/ Environmental Chemical Engineering Chemical Engineering Thermodynamics Engineering Economy/ Chemical Engineering Economics

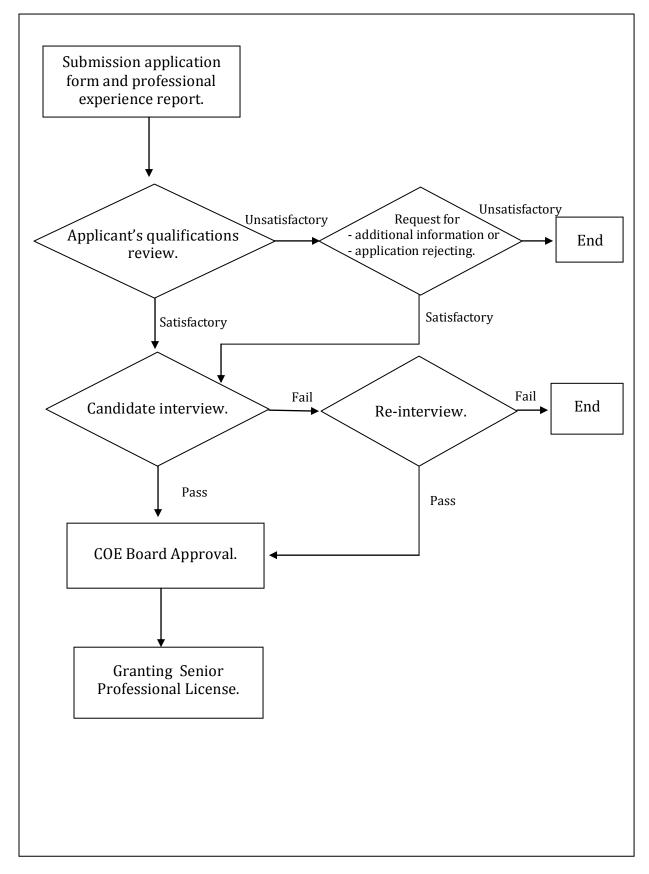
 ${\it Attachment~6} \\$ Workflow diagram: Application for Associate Engineer License



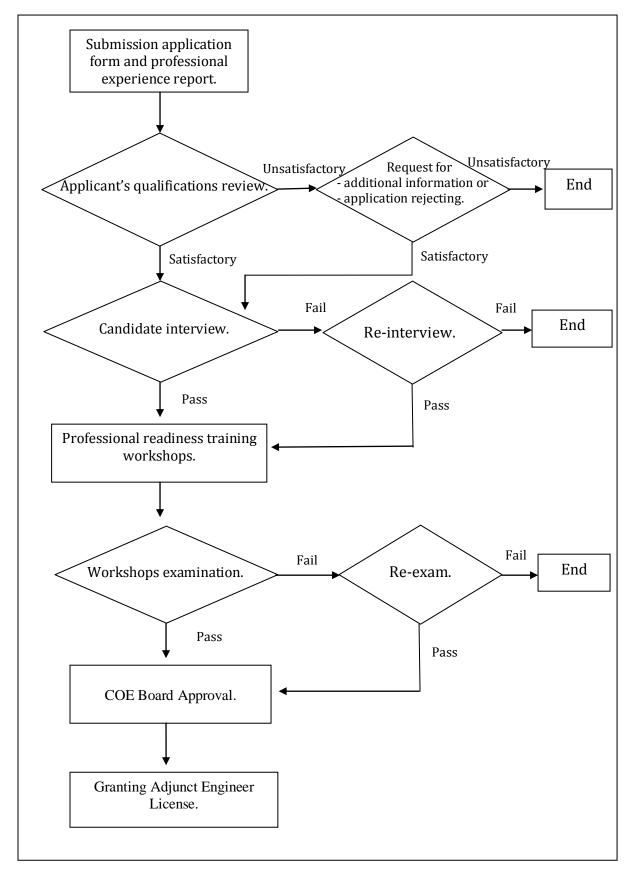
 ${\it Attachment~7}$ Workflow diagram: Application for Professional Engineer License



 ${\it Attachment~8} \\$ Workflow diagram: Application for Senior Professional Engineer License



<u>Attachment 9</u> **Workflow diagram: Application for Adjunct Engineer License**



Attachment 10

Continuing Professional Development (CPD)

The Council of Engineers of Thailand (COE) has set the activities that engineers can take for their Continuing Professional Development (CPD). We count the activities as the Professional Development Unit (PDU). The Activities are divided into 8 items as follows:

- 1. Formal learning
- 2. Informal learning
- 3. Seminar, conference and meeting
- 4. Participation in professional activities
- 5. Service activities
- 6. Industry involvement
- 7. Contribution to knowledge
- 8. Patents

All of the activities have different weights of score. The COE has set the score according to the activities as the table below.

No.	Activity		Sub-activity	Regulation	Weight
1	Formal learning Maximum 80 PDU. Minimum attendance time is 80 %. (Lectures and speakers are not		Courses taken in the University / College / Institute of Technology (higher than Bachelor's degree).	Count by course hours.	2.0
		t V	examinations organized by the organizations,	Pass the examination. Count by course hours.	2.0
			COE.	Fail the examination. Count by course hours.	1.5
		103	Training courses approved by COE.	Count by course hours.	1.5
		104	In – house training approved by COE.	Count by course hours.	1.0
		105	Other training courses organized by other nonengineering organizations, where affiliated with the government.	Count by course hours.	1.0

No.	Activity	Sub-activity	Regulation	Weight
2	Informal learning Maximum 20 PDU.	Self study with report or activity manual in new work involving high technology.	Count two hours per page of report or activity manual.	1.0
		202 Technical visit.	Count by visiting hours, excluding traveling time.	0.5
3	Participation in seminars, conferences and meetings.	Attending seminars and academic or professional conferences in country.	Count by the seminar or conference hours.	1.0
	Maximum 60 PDU.	Attending meetings as a committee or sub-committee member concerning academic or professional practice in country.	Count by attending hours.	1.0
		Attending international academic or professional seminars or conferences.	Count by the seminar or conference hours.	1.5
		Attending international meetings as a committee or sub-committee member concerning academic or professional practice.	Count by attending hours.	1.5
4	Participation in professional activities Maximum 60 PDU.	Heing a member of academic or professional associations approved by COE.	Count 10 hours per association.	1.0
		Being a committee of academic or professional associations approved by COE. (Shall attend a meeting at least 50 % of total number of meetings.)	Count 10 hours per association.	2.0
		Heing a sub-committee or working group of academic or professional associations approved by COE. (Shall attend a meeting at least 50 % of total number of meetings.)	association.	1.5

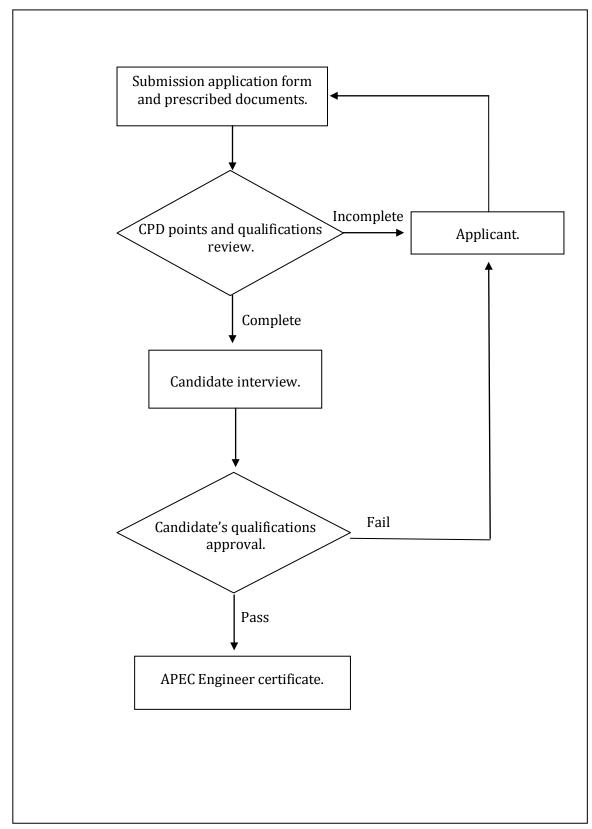
No.	Activity		Sub-activity	Regulation	Weight
5	Engineering service activities Maximum 80 PDU.	501	Being various academic committees concerning program of study of universities.		2.0
		502	Being a member or a committee of a Continuing Professional Development program.	Count 10 hours per program.	2.0
		503	Participating in the process of setting up and inspecting a Continuing Professional Development program.	Count by hours of participation	2.0
		504	Reviewing the technical aspects of various engineering works, such as, consider and review ministerial regulation, standard of industrial products, etc.	Count by working hours	2.0
		505	Being a committee of research projects for students who are studying in Bachelor, Master or Ph.D. degree in other universities only.	Bachelor's degree: count 5 hours per project. Master's degree and Ph.D.: count 10 hours per project.	1.0
6	Industry Involvement Maximum 80 PDU.		Consultancy services for industrial sector.	Count 10 hours per project.	1.0
		602	Doing research for industrial sector.	Count 10 hours per project.	2.0

No.	Activity	Sub-activity		Regulation	Weight
7	Contribution to Knowledge Maximum 80 PDU.	701	Developing the Code of Practice.	Count 5 hours per page for author. Count 2 hours per page for reviewer.	1.0
		702	Research, presentation, and writing articles in journals with peer review to be published in country.	Count 5 hours per page of the article. Count 40 hours per book.	1.0
		703	Research, presentation and writing articles in international journals with peer review.	Count 5 hours per page of the article. Count 40 hours per book.	1.5
		704	Research, presentation and writing articles in journals without peer review.	Count 5 hours per page.	0.5
		705	Being a reviewer of articles to be published in country.	Count 5 hours per page	1.0
		706	Being a reviewer of articles to be published in other country	Count 5 hours per page	1.5
		707	Being a lecturer of training courses with examination.	Count by lecture hours.	2.0
		708	Being a lecturer of training courses without examination.	Count by lecture hours.	1.5
		709	Being a lecturer of seminars and conferences.	Count by lecture hours.	1.0
8	Engineering Patents Maximum 100 PDU.	801	Patenting engineering innovations.	Count 40 hours per patent.	1.0



Attachment 11

Workflow diagram: Assessment on APEC Engineer Register



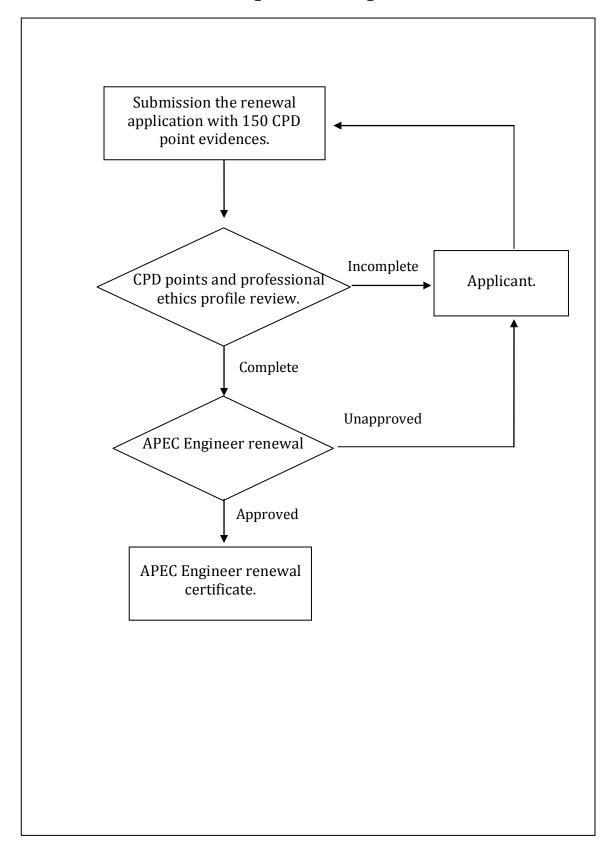
Attachment 12

Code of Ethics for Engineering Profession

Code of Ethics for Engineering Profession shall be prescribed as follows:

- 1. Do not conduct any practices that may result to the disgrace to the engineering profession;
- 2. Shall perform all professional practices in accordance with code of practices and technical soundness;
- 3. Shall practice the regulated engineering profession with honesty;
- 4. Do not unrighteously exercising and use powers and duties, influence or giving the benefit to any person for the purpose of acquiring or not acquiring any work for himself or the other person;
- 5. Do not wrongfully demand, accept, or agree to accept a property or any other benefit for himself or the other person from an independent contractor or any other person concerned in work undertaking with the employer;
- 6. Do not advertise or allow the other person to advertise, beyond the soundness of the practicing regulated engineering profession;
- 7. Do not practice, beyond the scope of his capability on the regulated engineering profession;
- 8. Do not unreasonably abandon the assigned work;
- 9. Do not affix his signature as the person who practices the regulated engineering profession on a piece of work that he did not, by himself, do, inspect or supervise;
- 10. Do not disclose any confidentiality relate to the performing work except permission it is allowed by the employer;
- 11. Do not compete the work that against to other person who practices the regulated engineering profession;
- 12. Do not agree to work, or inspect the same work that belongs to other person who practices the regulated engineering profession, except it is the work or inspection of his duty, or it has been noticed to the person in advance;
- 13. Do not agree to carry out the same work to the other employer for the purpose of the price competition, except a prior written notice has been sent to the former employer or a written consent of the former employer has been given, and such other employer has also been informed in advance;
- 14. Do not use or transcribe model, figure, plan or document relating to the work of the other person who practices the regulated engineering profession, except consent of the other person who practices the regulated engineering profession has been given;
- 15. Do not perform any practice by intension to cause the disgrace to the reputation or the work of the other person who practices the regulated engineering profession.

Attachment 13
Workflow diagram: APEC Engineer Renewal



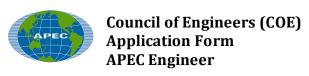
APEC Engineer Assessment Statement August 2016

Attachment 14

APEC Engineer Application Form

APEC Engineer Assessment Statemen





ne(in BLOCK LETTER) Date of Birth (DD/MM/YYYY) Expiry date Mobile No
Date of Birth (DD/MM/YYYY) Expiry date
Expiry date
Mohile No.
Mohile No.
PE License No.
Tel
Year of graduation
Year of graduation
Year of graduation
5. Responsible Charge/ Expertise
 Engineering Consultancy Project Planning Engineering Design and Calculations Construction and Production Supervision Investigation Operation and Maintenance Supervision

- (b) I shall be bound by the Engineer Act B.E. 2542 and the Professional Engineer Rules (Code of Professional Conduct and Ethics) established and enforced by the Council of Engineers, Thailand.
- (c) I shall be bound by the APEC Engineer Agreement and other relevant commitments in the future.

Date	Signature of Applicant



Detailed Description of Engineering Work (Please describe the contents and significance of the work, the applicant's role, and the degree of the applicant's responsibilities about 50 words.)

No.	Beginning and Ending Dates (MM/YYYY)	Position and Name of Organizations	Project Owners/ Clients	Details of Engineering Work
	Sur	n of Experience	Years Months	

Note:1. The applicant shall specify the professional experience at least 7 years after graduation.

2. The professional experience should be referred to the professional practice record (next page).



Engineering Work Experience*1 (Please describe in retrospective order, beginning with the most recent one.)

No.	Name of Organizations (Position/ Title)	Project Owners/ Clients	Beginning and Ending Dates (MM/YYYY)	Professional Practices	Duty/ Scope of Work	Professional Contribution/Outcome Performance	Endorser(s)' Signature*2	Remark
	Sum of Experience in Responsible Charge of Significant Engineering Work						Years M	onths

- Note: *1. The applicant shall specify at least 2 years in responsible charge of significant engineering works.
 - *2. The endorser(s) shall be, in principle, the applicant's direct supervisor(s) or any professional engineer/senior professional engineer under the applicant has executed his engineering works.
 - 3. Support document is required.



Continuing Professional Development (CPD) APEC Engineer Registration

Continuing Professional Development (CPD)

The applicant shall submit the CPD record together with the application as an APEC Engineer. (Please describe the continuing professional development activities and enclose certified copies of certificates, documents or etc.)

NO.	Date (DD/MM/YYYY)	Activities and Details of Activity	Organized by	Point		
	Total CPD Point					



Monitoring Committee Summary APEC Engineer Registration

Name of Applicant					
PE License/Certificate No	Issued by <u>Council of Engineers</u>				
Issued date (DD/MM/YYYY)	_ Expiry date (DD/MM/YYYY)				
Thailand Registered Engineer Registration No Issued date					
Thailand Registered Engineer's Discipline					
APEC Engineer Register Discipline					
Certified Compliance with APEC Engineer Crit					
Completed an accredited or recognized engine	eering program, or assessed recognized				
equivalent					
Been assessed within their own country as eli	gible for independent practice				
Gained a minimum of seven years practical ex	perience since graduation				
Spent at least two years in responsible charge	of significant engineering work				
Complied with the Continuing Professional De	evelopment (CPD) policy of the country				
of origin at the satisfactory level					
Confirmed signature on statement of complian	nce with code of ethics				
Signed					
()	()				
Delegated APEC Engineer	Chairman APEC Engineer				
Monitoring Committee (Thailand)	Monitoring Committee (Thailand)				
Date	Date				