ACCREDITATION CRITERIA

3.1 Introduction

PTC, consistent with its policy on accreditation, provides its criteria for accreditation of engineering programs to the public. These criteria are the basis for decisions on the accreditation of engineering programs submitted by higher educational institutions (HEIs). It is the responsibility of HEIs seeking accreditation of an engineering program to clearly demonstrate that the program fulfils or exceeds the criteria stated herein.

The PTC-ACBET criteria are intended to promote the continuous quality improvement of an engineering program and provide thresholds of quality assurance for accreditation. In keeping with the principles of continuous quality improvement, these criteria are subject to change from time to time.

In the formulation and review of the criteria, PTC-ACBET takes into consideration the local contexts of engineering education and practice and the regulatory and statutory requirements of the country. Reference is also regularly done to the accreditation systems, criteria and practices of other Washington Accord signatories and the Graduate Attributes and Professional Competencies[1] prepared by the International Engineering Alliance (IEA). PTC having been admitted as a Provisional Member of the Washington continually endeavors to substantially align its criteria with those of the IEA and benchmark its accreditation systems and practices with those of the Washington Accord signatories.

This second edition of the criteria and the guidelines has been prepared following the full review of PTC CASEE and after having resolved to fully adopt the latest set of Graduate Attributes published by the Washington Accord of the IEA as the basis of its Student Outcomes.

This section contains three parts. The first part defines important terms appearing in the criteria and the self-study report guidelines. The second part presents the criteria in two sub-parts, namely: a) the criteria which are applicable to all baccalaureate engineering degree programs, and, b) the set of criteria each one of which present additional requirement(s) specific, if any, to a particular field of engineering. The third part, on the other hand, presents the summary of the current major changes to the criteria.

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[1]Graduate Attributes and Professional Competencies, Version 3:21 June 2013 published by the International Engineering Alliance.

3.2 Definition of Terms

1. **Institutional Mission and Vision**

   Institutional Mission and Vision are statements on the long-term view of the educational institution of itself and of the world within which it operates including the fundamental

   purpose of its existence, its long-term role and stature, and, what it does to achieve this purpose and how it would like to play its role.

2. **Program Educational Objectives**

   Program educational objectives are broad statements that describe what graduates are expected to achieve in their professional and career practice three to five years after graduation. Program educational objectives are based on the needs of the program's constituencies.

3. **Student Outcomes**

   Student outcomes specify what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, attitudes and values that students acquire as they progress through the program.

4. **Duration of a Semester (quarter) and Number of Semesters (quarters) in a Baccalaureate Engineering Program**

   An engineering baccalaureate degree program usually consists of a curriculum typically implemented over 8 to 10 semesters. Each semester consists of several courses conducted over 15-18 weeks. The total credits for a semester is typically 16 credit hours. One credit hour of a lecture course consists of one hour per week for 15 weeks. One credit hour of laboratory course consists of three hours of laboratory work per week for 15 weeks.

5. **Assessment**

   Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes and program educational objectives. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or outcome being measured. Appropriate sampling methods may be used as part of an assessment process.

6. **Evaluation**

   Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes and program educational objectives are being attained. Evaluation results in decisions and actions regarding program continuous quality improvement.

7. **Continuous Quality Improvement**

   Continuous Quality Improvement is a periodic feedback process for changing any aspect of a program whereby formal results from assessment and evaluation and other informal observations are utilized in the formulation of the changes, with expected higher degrees of attainment of program educational objectives and higher degrees of attainment of student outcomes.

8. **Accreditation (Program Accreditation)**

   Recognition or acknowledgement that a program meets applicable criteria as a result of an assessment and evaluation process and the process itself.

9. **Certification**

   Recognition or acknowledgement given to the implementation of an assessment and evaluation process for a program as having substantially met the requirements of PTC policies, guidelines, criteria and procedures.

10. **Complex Engineering Problems**

    A class of problem with characteristics further defined in Section 4.1 of the IEA Graduate Attributes and Professional Competence Version 3: 21 June 2013. These are problems that cannot be resolved without in-depth engineering knowledge and have some or all of the following characteristics:

    a) Involve the use of research-based knowledge much of which is at the forefront of the professional discipline and which allows a fundamental-based, first principles analytical approach
    b) Involve wide-ranging or conflicting technical, engineering and other issues
    c) Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
    d) Involve infrequently encountered issues
    e) Are outside problems encompassed by standards and codes of practice for professional engineering
    f) Involve diverse groups of stakeholders with widely varying needs
    g) Have significant consequences in a range of contexts
    h) Are high level problems including many component parts and sub-problems

3.3 Accreditation Criteria

The following lists the criteria that a program must satisfy in order for it to be accredited or re-accredited. The first 9 criteria are applicable to all engineering programs irrespective of the field of specialization. On the other hand, Criterion 10 – Specific Program Criteria presents the additional specific requirements for each of the engineering disciplines presented therein.

Criterion 1. Program Educational Objectives

There must be documented and published program educational objectives that are consistent with the mission and vision of the institution. The program educational objectives must reflect the particular field(s) of engineering practice and the associated area(s) of specialization, the desired characteristics and/or capabilities of the graduates after 3-5 years of their career following graduation, the anticipated career destinations of graduates and the needs of the appropriate external stakeholders.

A formal and documented process to develop and review the program educational objectives is in place. The review process must be periodic and must ensure and demonstrate that the objectives are based on the needs of the program's various stakeholders. External stakeholders' inputs are critical to the development, review and monitoring process of the objectives.

Criterion 2. Student Outcomes

The program must have established and documented student outcomes that support the attainment of the program educational objectives by the graduates. The program must demonstrate that graduates of the program possess the attributes of the student outcomes by the time of graduation. PTC adopts the set of Graduate Attributes published by the Washington Accord of the International Engineering Alliance as the bases for the alignment of its Student Outcomes. In case the program decides to articulate its own student outcomes, the equivalency to address all the student outcomes stipulated hereunder as (a) to (l) must be established.

Student outcomes are outcomes enumerated as (a) through (l).

a) Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

b) Conduct investigations of complex engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

c) Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

d) Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

e) Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

f) Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

g) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

h) Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental context.

i) Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

j) Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.

k) Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems with an understanding of the limitations.

l) Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Criterion 3. Students

Students admitted to the program must have the educational background needed to undertake the tertiary-level treatment of the engineering degree courses and have a reasonable prospect of achieving the student outcomes, thereby enabling graduates to attain the program educational objectives. Appropriate policies and processes must be in place and enforced for admissions, transfers, progression, retention, student progress monitoring and performance evaluation, student advising on curricular and career matters, guidance and support, academic exchange, promotion and graduation, and ensure that the students continually achieve desired learning outcomes.

The program must ensure and document that all students who are promoted or graduated meet all the requirements for promotion or graduation.

Criterion 4. Faculty and Support Staff

There must be a sufficient number of competent faculty to cover all of the curricular areas of the program and to assure adequate levels of student-faculty interaction and student advising and counselling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students. The faculty must have the appropriate academic qualifications and professional competencies needed to assure the continuity and stability of the program.

The program must not be critically dependent on a single individual; the faculty must be involved in implementation and decisions of the program. The program must have professional development opportunities for the faculty to participate in research/innovations/scholarly works, professional development activities and industry-academe interactions. The faculty member must have sufficient authority to ensure the proper guidance, development and implementation of the processes for the assessment, evaluation, and continuing improvement of the program.

The number of qualified support staff, both administrative and technical provided to the program, must be adequate to meet the program needs. There must be a development program for the support staff.

Criterion 5. Curriculum

There is no minimum specification of credit hours in any of the following areas: mathematics and basic science, engineering science including design, research and industry immersion need to be justified carefully and in sufficient details in terms of meeting student outcomes and program educational objectives. The program must ensure that its curriculum encompasses the desired elements of Knowledge Profile, the Range of Complex Problem Solving and Complex Engineering Activities as stipulated in the latest set of Graduate Attributes and Professional Competence document published by the IEA. Engineering specialist knowledge appropriate and fundamentals to the accepted practice areas of the engineering discipline must specially be in the forefront of the engineering discipline. The curriculum must cover the following six areas:

a) Mathematics and basic sciences: The study of mathematics and basic sciences is fundamental in understanding the physical world in relation to engineering. It will serve as a foundation to the engineering theories and principles
b) Engineering Sciences: have roots in the mathematical and physical sciences, and where applicable, in other basic sciences but extend knowledge and develop models and methods in order to lead to engineering applications and solve engineering problems
c) Engineering Design and Synthesis: is the creative, iterative and often open-ended process of conceiving and developing components, systems and processes. Design projects must include complex engineering problems requiring integration of engineering, basic and mathematical sciences, working under constraints, taking into account economic, health and safety, social and environmental and sustainability factors, codes of practice and applicable laws, and standards in the field. Students must be prepared for engineering practice through a curriculum culminating in the demonstration of learning outcomes at complex engineering problems which is commonly incorporated in a major final-year design experience or capstone project based on the knowledge and skills acquired in earlier course

works, specialized courses and incorporating appropriate engineering standards and multiple realistic constraints on the final year of the engineering curriculum.

d) Complementary Studies: Disciplines outside engineering which are essential for professionalism and ethics. Studies are selected from political science, economics, effective communication, literature, history, art, philosophy, psychology, ethics, etc

e) Laboratory and Field Work - Courses should be supported by meaningful laboratory work, well coordinated with the lecture material and supported with relevant up-to-date equipment and modern engineering and IT tools.

f) Industry Immersion: Exposure of the students to industry, which enriches the total engineering educational program.

Criterion 6. Program Resources and Learning Environment

Classrooms, offices, laboratories, associated equipment and support facilities must be adequate to attain the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and periodically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources and laboratories available to the program in adherence to good practices related to environment, health and safety.

The library services and the computing and information infrastructure must be adequate to support the scholarly and professional activities of the students and faculty. Students must have sufficient opportunities for self-study and research including open educational resources.

Criterion 7. Leadership and Institutional Support

Leadership and institutional support must be adequate to ensure the quality and continuity of the program. Appropriate and effective processes shall be established, implemented and maintained such as, environmental scanning and internal assessment, in the review and improvement of current programs and in the formulation and offering of new engineering-related programs.

Resources including institutional services, financial support, and staff (both administrative and technical) provided to the program must be adequate to meet program needs. The resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. The resources available to the program must be sufficient to acquire, maintain, and operate infrastructures, facilities, and equipment appropriate for the program, and to provide an environment in which student outcomes can be attained.

Criterion 8. Program Linkages

a) Industry-Academe Linkage

i) There must be regular active participation from industry in planning and defining program educational objectives, student outcomes and curricula to ensure that these are relevant and up-to date with societal and professional requirements.

ii) There must be faculty/student industry exposure through industry immersion, industry-visits, collaborative projects under professionals in industry and industry-based final year projects.

iii) There must be a sustainable mechanism among the industry, academe and professional engineering societies.

b) Community-Oriented Programs

There must be evidence that students and student organizations have programs to assist communities not only as an avenue for societal service but also to gain understanding of the impact of engineering solutions to the local context. Consultation with the communities should be conducted to determine their needs. Possible projects may involve assistance to high school students on potential science/engineering fairs. Community assistance may involve projects such as helping design low-cost computing, low-cost access to the internet, product and process development and such other activities that involve the general and affordable utilization of their technological expertise.

c) Engagement in Professional Practice

The program must provide non-degree educational services on new technologies and new professional topics, to assist engineers from industry, academe or other institutions or societies in keeping abreast of new developments in the field. Courses may be developed and updated in collaboration with the industry and professional societies.

There must be a formal monitoring and assessment of the Criterion to support the attainment of student outcomes.

Criterion 9. Continuous Quality Improvement (CQI)

- There must be appropriate documented processes for the periodic assessment and evaluation of the program educational objectives and of the student outcomes.

- There must be evidence that results of the evaluation of program educational objectives and results of the evaluation of student outcomes are utilized to make changes in the program processes such as course syllabi, curriculum, and any other aspect of the program to improve the degrees to which the student outcomes and program educational objectives are achieved.

- There must be feedback to and from all concerned stakeholders on the achievement of undergraduate students for the student outcomes and graduates for the achievement of the program educational objectives.

- There must be a Continuous Quality Improvement program with adequate supporting resources and subject to an internal quality audit.

Criterion 10. Specific Program Criteria

The following pages sets out requirements specific for each of the following engineering programs:

- **Aeronautical and Aerospace Engineering**
- **Agricultural and Biosystems Engineering**
- **Chemical Engineering**
- **Civil Engineering**
- **Computer Engineering**
- **Electrical Engineering**
- **Electronics Engineering**
- **Geodetic Engineering**
- **Industrial Engineering**
- **Mechanical Engineering**
- **Metallurgical Engineering**
- **Materials Engineering**
- **Mining Engineering**
- **Naval Architecture and Marine Engineering**
- **Sanitary Engineering**

PROGRAM CRITERIA FOR
AERONAUTICAL ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Society of Aerospace Engineers of the Philippines

These program criteria apply to engineering programs with “aeronautical”, ‘austronautical” and/or “aerospace” engineering in their titles.

1. Curriculum

   Aeronautical engineering programs must demonstrate that graduate knowledge of aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control.

   Astronautical engineering programs must demonstrate that graduates have a knowledge of orbital mechanics, space environment, altitude determination and control, telecommunications, space structures, and rocket propulsion.

   Aerospace engineering programs or other engineering programs must demonstrate that graduates have knowledge covering one of the areas – aeronautical engineering or astronautical engineering as described above- and, in addition, knowledge of some topics from the area not emphasized.

   Programs must also demonstrate that graduates have design competence that includes integration of aeronautical or astronautical topics.

2. Faculty

   Program faculty must have responsibility and sufficient authority to define, revise, implement, and achieve program objectives. The program must demonstrate that faculty teaching upper-division courses have an understanding of current professional practice in the aerospace industry.

PROGRAM CRITERIA FOR
AGRICULTURAL AND BIOSYSTEMS
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Society of Agricultural and Biosystems Engineers

These program criteria apply to engineering programs with "agricultural engineering" in their titles.

1. Curriculum

   Programs must demonstrate that graduates have proficiency in mathematics through differential equations and in biological and engineering sciences consistent with the program educational objectives. Competence must be demonstrated in the application of engineering to agriculture, aquaculture, forestry, human, or natural resources.

2. Faculty

   The program shall demonstrate that those faculty members teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of education and experience or professional licensure.

PROGRAM CRITERIA FOR **CHEMICAL** AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Institute of Chemical Engineers

These program criteria apply to engineering programs with "chemical engineering" in their titles.

1. Curriculum

The program must be consistent with the CHED – CMO and should demonstrate that graduates have: the competence to apply (grounding in the) mathematics and basic sciences including chemistry, physics, and biology appropriate to the objectives of the program; and sufficient knowledge in the application of these basic sciences to enable graduates to plan and undertake research and development, design, apply value engineering, analyze, and control physical, chemical and biological processes, consistent with the program educational objectives. This also includes the preparation of feasibility studies and materials specification and supervision of the installation of industrial plant, the operations of the plant and the related pollution control abatement processes or operations taking cognizance of quality, environmental and health and safety management systems in pursuit of these.

2. Faculty

The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, and/or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.

The program must demonstrate that faculty members responsible for the upper-level professional programs are maintaining currency in their specialty area. Evidence must be provided that the program faculty understand professional practice and maintain currency in their respective professional areas.

PROGRAM CRITERIA FOR
CIVIL ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Institute of Civil Engineers

These program criteria apply to engineering programs with "civil engineering" in their titles.

1. Curriculum

   The program must demonstrate that graduates can: apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of science, consistent with the program educational objectives; apply knowledge of four technical areas appropriate to civil engineering; conduct civil engineering experiments and analyze and interpret the resulting data; design a system, component, or process in more than one civil engineering context; explain basic concepts in management, business, public policy, and leadership; and explain the importance of professional licensure.

2. Faculty

   The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.

PROGRAM CRITERIA FOR
COMPUTER ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Institute of Electronics Engineers of the Philippines (IECEP)
(Computer Engineering Division)

These program criteria apply to engineering programs with “computer engineering” in their titles.

1. Curriculum

The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.

The program must demonstrate that graduate have: knowledge of probability and statistics, including applications appropriate to the program name and objectives; and knowledge of mathematics through differential equations, basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to program objectives.

Programs containing the modifier “computer” in the title must also demonstrate that graduates have a knowledge of discrete mathematics.

2. Faculty

The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure and/or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.

PROGRAM CRITERIA FOR **ELECTRICAL ENGINEERING** AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Institute of Integrated Electrical Engineers of the Philippines

These program criteria apply to engineering programs with “electrical engineering” in their titles.

1. Curriculum

The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.

The program must demonstrate that graduate have: knowledge of probability and statistics, including applications appropriate to the program name and objectives; and knowledge of mathematics through differential equations, basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to program objectives.

Programs containing the modifier “electrical” in the title must also demonstrate that graduates have a knowledge of advanced mathematics, typically including, linear algebra, complex variables, and discrete mathematics.

2. Faculty

The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, and/or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.

PROGRAM CRITERIA FOR **ELECTRONIC ENGINEERING** AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Institute of Electronics Engineers of the Philippines (IECEP)

These program criteria apply to engineering programs with "electronic engineering" in their titles.

1. Curriculum

The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program.

The program must demonstrate that graduate have: knowledge of probability and statistics, including applications appropriate to the program name and objectives; and knowledge of mathematics through differential equations, basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to program objectives.

Programs containing the modifier "electronics" in the title must also demonstrate that graduates have a knowledge of advanced mathematics, typically including, linear algebra, complex variables, and discrete mathematics.

2. Faculty

The program must demonstrate that faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure and/or by education and design experience. The program must demonstrate that it is not critically dependent on one individual.

PROGRAM CRITERIA FOR
GEODETIC ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Geodetic Engineers of the Philippines

These program criteria apply to engineering programs with “geodetic engineering” in their titles.

1. Curriculum

   The program must demonstrate that graduates have competency in one or more of the following areas: boundary and/or land surveying, geographic and/or land information systems, photogrammetry, mapping, geodesy, remote sensing, and other related areas.

2. Faculty

   Programs must demonstrate that faculty members teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure or by educational and design experience.

PROGRAM CRITERIA FOR
INDUSTRIAL ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Institute of Industrial Engineers

These program criteria apply to engineering programs with “industrial engineering” in their titles.

1. Curriculum

The program must demonstrate that graduates have the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy.

The program must include in-depth instruction to accomplish the integration of systems using appropriate analytical, computational, and experimental practices.

2. Faculty

Evidence must be provided that the program faculty understand professional practice and maintain currency in their respective professional areas. Program faculty must have responsibility and sufficient authority to define, revise, implement and achieve program objectives.

PROGRAM CRITERIA FOR
MECHANICAL ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Society of Mechanical Engineers

These program criteria will apply to all engineering programs with “mechanical engineering” in their titles.(See CHED CMO)

1. Curriculum

   The program must demonstrate that graduates have the ability to : apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) to model, analyze, design, and realize physical systems, components or processes; and work professionally in both thermal and mechanical systems areas.

2. Faculty

   The program must demonstrate that faculty members responsibly for the upper-level professional program are maintaining currency in their specialty area.

PROGRAM CRITERIA FOR
MATERIALS, OR, METALLURGICAL ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead society: Society of Metallurgical Engineers of the Philippines

These program criteria apply to engineering programs with ”metallurgical engineering”,“materials engineering”, and/or “ceramic engineering” in their titles. All programs in the materials related areas share these criteria, including programs with materials, materials processing, ceramics, glass, polymer, metallurgical, and similar modifiers in their titles.

1. Curriculum

The program must demonstrate that graduates have: the ability to apply advanced science (such as chemistry and physics) and engineering principles to materials systems implied by the program modified, e.g., ceramics, metals, polymers, composite materials, etc.; an integrated understanding of the scientific and engineering principles underlying the four major elements of the field; structure, properties, processing, and performance related to material systems appropriate to the field; the ability to apply and integrate knowledge from each of the above four elements of the field to solve materials selection and design problems,; the ability to utilize experimental, statistical and computational methods consistent with the program educational objectives.

2. Faculty

The faculty expertise for the professional area must encompass the four major elements of the field.

PROGRAM CRITERIA FOR
MINING ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Society of Mining Engineers

These program criteria apply to engineering programs with “mining engineering” in their titles.

1. Curriculum

   The program must demonstrate that graduates have: the ability to apply mathematics through differential equations, calculus-based physics, general chemistry, and probability and statistics as applied to mining engineering problems applications; fundamental knowledge in the geological sciences including characterization of mineral deposits, physical geology, structural or engineering geology, and mineral and rock identification and properties; proficiency in statistics, dynamics, strength of materials, fluid mechanics, thermodynamics, and electrical circuits; proficiency in engineering topics related to both surface and underground mining, including: mining methods, planning and design, ground control and rock mechanics, health and safety, environmental issues, and ventilation; proficiency in additional engineering topics such as rock fragmentation, materials handling, mineral or coal processing, mine surveying, and valuation and resource/reserve estimation as appropriate to the program objectives.

   The laboratory experience must lead to proficiency in geologic concepts, rock mechanics, mine ventilation, and other topics appropriate to the program objectives

2. Faculty

   Evidence must be provided that the program faculty understand professional engineering practice and maintain currency in their respective professional areas. Program faculty must have responsibility and authority to define, revise, implement, and achieve program objectives.

PROGRAM CRITERIA FOR
NAVAL ARCHITECTURE AND MARINE ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Society of Naval Architects and Marine Engineers

These program criteria apply to engineering programs with “naval architecture” and “marine engineering” in their titles.

1. Curriculum

The program must demonstrate that graduates have: the ability to apply probability and statistical methods to naval architecture and marine engineering problems; basic knowledge of fluid mechanics, dynamics, structural mechanics, material properties, hydrostatics, and energy/propulsion systems in the context of marine vehicles; familiarity with instrumentation appropriate to naval architecture and/or marine engineering.

2. Faculty

Program faculty must have sufficient curricular and administrative control to accomplish the program objectives. Program faculty must have responsibility and sufficient authority to define, revise, implement and achieve the program objectives.

PROGRAM CRITERIA FOR
SANITARY ENGINEERING
AND SIMILARLY NAMED ENGINEERING PROGRAMS

Lead Society: Philippine Society of Sanitary Engineers

These program criteria apply to engineering programs including “sanitary”, “environmental and sanitary”, or similar modifiers in their titles.

1. Curriculum

The program must prepare graduates to be proficient in mathematics through differential equations, probability and statistics, calculus-based physics, general chemistry; an earth science, e.g., geology, meteorology, soil science relevant to the program of study; a biological science, e.g., microbiology, aquatic biology, toxicology, relevant to the program of study; fluid mechanics relevant to the program of study; introductory level knowledge of environmental issues associated with air, land, and water systems and associated environmental health impacts; conducting laboratory experiments and critically analyzing and interpreting data in more than one major environmental engineering focus area, e.g., air, water, land, environmental health; performing engineering design by means of design experiences integrated throughout the professional component of the curriculum; to be proficient in advances principles and practice relevant to the program objectives; understanding of concepts of professional practice and the roles and responsibilities of public institutions and private organizations pertaining to environmental engineering.

2. Faculty

The program must demonstrate that a majority of those faculty teaching courses which are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, and equivalent design experience.

3.4 Current Changes to the Criteria

The current edition features the following revisions from earlier versions of CASEE:

a) Criterion 2 Student Outcomes is revised referencing the Washington Graduate Attributes and Professional Competencies Version 3: 21 June 2013 as the basis of its Student Outcomes.

b) Criterion 5 Curriculum is revised to incorporate requirements for the curriculum to “encompass the desired elements of Knowledge Profile, the Range of Complex Problem Solving and Complex Engineering activities as stipulated in the latest sect of Graduate Attributes and Professional Competencies document as published by the IEA.