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ENGINEERING TECHNOLOGY PROGRAMME ACCREDITATION STANDARD 2020

Notes on the period for which this Standard takes effect:

1. Accreditation is accorded based on graduation years for students, not intake years.
2. Any new provision or any change to any existing provision in the Standard will take effect on 1st May 2020, and will be effective for all student cohorts from year 1 to year 4.
3. Where programmes require time to adapt to any change, ETAC will allow adequate time for a reasonable transition to take place as justified by the programme.
4. In continually improving the Standards, the intention of ETAC is to accord the benefits to all students as soon as practically possible.

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DEFINITIONS

Acronyms

BEM	-	Board of Engineers Malaysia
CQI	-	Continual Quality Improvement
ETAC	-	Engineering Technology Accreditation Council
ETAD	-	Engineering Technology Accreditation Department
IEM	-	The Institution of Engineers, Malaysia
IHL	-	Institution of Higher Learning (includes public or private universities, and other institutions authorised by legislation to award engineering degrees)
JPA	-	Jabatan Perkhidmatan Awam (Public Services Department)
MQA	-	Malaysian Qualification Agency
MOE	-	Ministry of Education
OBE	-	Outcome-Based Education is an approach that focuses on outcomes, i.e. the achievements of students that are measurable, proven, and can be improved.
SPM	-	Sijil Pelajaran Malaysia (Malaysia Certificate of Education)
STPM	-	Sijil Tinggi Persekolahan Malaysia (Malaysia Higher School Certificate of Education)
WBL	-	Work Based Learning
DL	-	Dependent Learning (Guided Learning)
IL	-	Independent Learning
IG	-	Industrial Guidance
ELT	-	Effective Learning Time

General

Evaluation Panel	-	A panel of evaluators appointed by ETAC to verify programme compliance with accreditation criteria.
Accreditation Appeals Board	-	A Board to consider appeals from an Institution of Higher Learning on any ETAC decision.
Engineering Technologist		A person registered under Section 10C(1), Registration of Engineers Act 1967 (Revised 2015).
Graduate Engineer	-	A person registered under Section 10(1)(a), Registration of Engineers Act 1967 (Revised 2015).
Professional Engineer	-	A person registered under Section 10(2), Registration of Engineers Act 1967 (Revised 2015).

Institutions of Higher Learning and Programme

Faculty	-	The entity which includes schools and departments responsible for designing and conducting the programme to be accredited.
Programme	-	The sequence of structured educational experience undertaken by the students leading to completion, on satisfactory assessment of performance.
Degree	-	An engineering technology qualification in Malaysia normally titled Bachelor of Engineering Technology.
Course	-	Subject offered in the programme.
Stakeholders	-	Parties having interests (direct or indirect) in the programme output, for example; employers, sponsors, lecturers, and students.
Teaching Staff	-	Staff responsible for teaching and learning activities in the programme leading to the award of an engineering technology degree.
Student	-	Anyone undertaking an undergraduate programme.
Graduate	-	Anyone who has been conferred a degree.
Support staff	-	Staff responsible for supporting teaching, learning and administrative activities in the programme implementation.
Industry Mentor	-	A qualified and/or competent employee of an industry who is appointed by the industry (employer) and agreed upon by the IHL to teach/guide, mentor and assess WBL students at the workplace
External Examiner	-	A person with high academic standing appointed by the IHL to assess academic quality and standard of the programme.
Industry Advisory Panel	-	A body consisting of professionals from industries, government, professional organisation, regulatory, alumni etc., appointed by the IHL to ensure the programme's relevancy to the stakeholders' needs.

Accreditation

Approval	-	Permission from the relevant authorities to conduct a new programme.
Accredited Programme	-	An engineering technology programme whose graduates are acceptable for graduate technologist registration with BEM. This is accorded to a programme that satisfies the minimum standard for accreditation set by ETAC.
Accreditation with Interim condition	-	A programme given some conditions to be fulfilled within certain period of time which is shorter than the accorded accreditation period. A programme given some conditions to be fulfilled within certain period of time which is shorter than the accorded accreditation period.
Continuing	-	A programme applying for extension of accreditation in the same cycle.
Deferred Accreditation	-	This is the status given to a programme observed to have weakness. This programme is given the opportunity to provide for corrective actions within a year from the date of deferment or as determined by ETAC.
Declined Accreditation	-	This is given to a programme that fails to meet the minimum standard for accreditation and has major shortcomings. In such a case, a further application is not normally considered within the next one year.
Cessation/ Termination of Accreditation	-	ETAC reserves the right to cease/terminate the accreditation if there is non-compliance or breach of accreditation requirements after accreditation has been given.
Provisional Accreditation	-	This is given to a programme that has been approved by BEM to be conducted.

1.0 Introduction

The Board of Engineers Malaysia (BEM) registers inspector of works, engineering technologists, graduate engineers and professional engineers under the Registration of Engineers Act 1967 (Revised 2015). The pre-requisite for registration inspector of works, engineering technologists and graduate engineers is any qualification in engineering recognised by the BEM.

The BEM therefore has a duty to ensure that the quality of engineering, engineering technology and engineering technician education programmes of its registered engineers, engineering technologists and engineering technicians/inspector of works attains the minimum standard comparable to global practice. Hence the necessity to accredit engineering, engineering technology and engineering technician education programmes conducted in IHLs.

Engineering Technology Accreditation Council (ETAC) is the body delegated by BEM for accreditation of engineering technology degrees and engineering technician qualifications. ETAC is made up of representatives from the BEM relevant learned societies, related Ministries, related government agency, industry employers of Engineering Technologists and Engineering Technicians in Malaysia, and public representative. The Terms of Reference of the ETAC are outlined in Appendix A (Engineering Technology Accreditation Council, Evaluation Panel and Accreditation Appeals Board).

This Standard outlines details for accreditation of an engineering technology programme in Malaysia. It serves to facilitate Institutions of Higher Learning (IHLs) to meet the minimum standard stipulated for the accreditation of their existing engineering technology programmes as well as proposed new programmes.

This Standard includes elements of outcomes in the engineering technology curriculum to ensure a Continual Quality Improvement (CQI) culture in the spirit of Outcome-Based Education (OBE).

2.0 Accreditation Objective

The objective of accreditation is to ensure that graduates of the accredited engineering technology programmes satisfy the minimum academic requirements for registration as a engineering technologist with the Board of Engineers Malaysia (BEM).

In addition, the objective of accreditation is to ensure that Continual Quality Improvement (CQI) is being practiced by IHLs, and accreditation may also serve as a tool to benchmark engineering technology programmes offered by IHLs in Malaysia.

3.0 Engineering Technology

The MQA Programme Standards on Engineering and Engineering Technology (MQA, 2011) has defined Engineering Technology as follow:

Engineering Technology is that part of the technological field that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities.

Technology has been evolving ever rapidly with time since man began to be more creative and innovative. Technology education has also evolved and very much subject to the demands of the industry. Engineering Technology programmes are oriented towards application, and provide their students with introductory mathematics and science courses, and only a qualitative introduction to engineering fundamentals and applied sciences. The graduates are exposed to almost similar courses with those of the engineering curricula but variation in the distribution of theories and hands-on skills are different.

Graduates acquiring an engineering technology Bachelor's Degree are often hired to work as engineering technologists or applied engineers in various positions such as product design, testing, development, systems engineering, field engineering, technical operations, and quality control etc. Engineering technologists implement engineering works by applying engineering and scientific knowledge combined with technical skills to support engineering activities. Their areas of interest in education are typically application oriented, while being somewhat less theoretical and mathematically oriented than their engineering counterparts. They typically focus their activities on applied design, using current engineering practice. Engineering Technologists play key roles in the engineering team. Their involvement is mainly in product development, manufacturing, product assurance, sales and programme management.

Some engineering technologist qualifications include an emphasis on technical management as well as grounding in a particular area of technology. Technical management is seen as an appropriate field of specialisation in itself, and many technologists build their career paths in this direction. Examples of such specialisation include product development for manufacturing, manufacturing management, aviation management, and management and maintenance of processing plants, complex building services, or testing laboratories.

Disciplines of engineering technology may relate to a particular technology or group of technologies – such as instrumentation, optoelectronics, information technology, computer networking, and robotics – that have application in many contexts. Alternatively, they may relate to the technologies supporting a particular industry sector, such as air conditioning and refrigeration, aviation, biomedical industry, manufacturing, railway signalling. The term technology is used below in the singular, and should be understood to mean also a group of technologies supporting an industry sector.

This introduction does not cover in detail all branches of Engineering Technology, due to its wide range of technical specialisation within the technology spectrum.

4.0 Programme Educational Objectives

Programme Educational Objectives are specific goals consistent with the mission and vision of the IHL, are responsive to the expressed interest of programme stakeholders, and describe the expected achievements of graduates in their career and professional life a few years after graduation.

5.0 Programme Outcomes

Programme Outcomes are statements that describe what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviour that students acquire through the programme.

Students of an engineering technology programme are expected to attain the following in the practice oriented learning environment:

(i) **Knowledge:** apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies; (SK1 to SK4)

(ii) **Problem analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation; (SK1 to SK4)

(iii) **Design/ development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations; (SK5)

(iv) **Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions; (SK8)

(v) **Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations; (SK6)

(vi) **The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems; (SK7)

(vii) **Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development; (SK7)

(viii) **Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice; (SK7)

(ix) **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse technical teams;

(x) **Communications:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;

(xi) **Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments;

(xii) **Life Long Learning:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

The range of broadly-defined problem solving and engineering activities is given in the tables of Section (a) Definition of Broadly-defined Problem Solving; and Section (b) Definition of Broadly-defined Engineering Activities in Appendix B respectively.

6.0 Accreditation Policy

This section outlines the ETAC's accreditation policy underlying the whole accreditation process. Accreditation will be considered upon the written request from the IHL.

6.1 The Accreditation Process

Accreditation of engineering technology programmes undertaken by the ETAC at the request of the IHL.

The ETAC's accreditation process will focus on outcomes and the IHL developed internal systems, which ensure that the graduates are adequately prepared to enter the engineering profession.

The process also involves determining the effectiveness of the quality assurance systems and procedures that ensure graduates are adequately prepared to enter the engineering practice.

6.2 The Accreditation Cycle

Accreditation is accorded to a programme for a maximum period of six years. The IHL shall apply for re-accreditation not less than six months before the expiry of the accreditation period.

Accreditation is accorded on a full programme cycle basis, specifying the years following and including the year approval is given.

6.3 Programmes

An IHL may offer programme/s via various modes and at different locations, such as fulltime, franchised, twinning, part-time, distance learning, joint degree, multi campus etc. For each of the programmes, the IHL shall apply for accreditation separately. However, if any programme at a different location and/or via a different mode of delivery fails to get accreditation and the degree issued by the IHL does not differentiate with regard to the location and/or mode of delivery, ETAC may take action to withdraw accreditation of any such programmes by that IHL.

A programme shall be evaluated based on the criteria stipulated in Section 8 of this Standard.

6.4 Application and Preparation for Accreditation Visit

The IHL should make an application for programme accreditation as per the requirements of Section 8 of the Standard to MQA and ETAC. Appendix C shows the process flow chart on Application for Accreditation and Approval of Engineering Technology Programmes.

If the documents submitted are found to be inadequate, the IHL shall be required to provide further information before an accreditation visit can be scheduled. The application will be deemed to have been withdrawn if further information is not submitted within a period of 3 months upon request.

6.5 Accreditation Evaluation

An accreditation evaluation is conducted to verify that the programme under evaluation is in compliance with the appropriate accreditation criteria in this Standard.

The evaluation exercise shall be conducted by an Evaluation Panel appointed by ETAC (refer to Appendix A).

6.6 Accreditation Decision

Upon completion of the programme accreditation exercise, the ETAC, based on the recommendation of the Evaluation Panel, may decide on the graduating cohorts one of the following:

i. To accord accreditation for six years.
ii. To accord accreditation for six years with interim report within three years.
iii. To accord accreditation for three years
iv. To decline/defer accreditation. In case of decline, a further application will normally not be considered within the next one year.

The ETAC may defer its decision on accreditation under certain circumstances to allow the IHL to fulfil condition(s) that may be imposed by the ETAC.

The ETAC's decision shall be sent to MQA with copies to IHL and MOE. The accreditation shall be accorded to a specific programme, location and mode.

6.7 Revisions to an Accredited Programme

The IHL shall advise the ETAC of changes made to an accredited programme exceeding 30% thereof. Failure to do so may cause the ETAC to withdraw the accreditation. The ETAC may then direct the IHL to apply for re-accreditation of the revised programme. However, there is no guarantee that the programme will continue to be accredited if there is contravention with the changes.

6.8 The Approval to Conduct a Programme

The IHL intending to conduct a new programme shall obtain approval from the relevant authorities.

The IHL should submit the complete set of documents as specified in Section 8 of this Standard to the ETAC and MQA for programme evaluation. The recommendation from ETAC shall be forwarded to the relevant authorities.

When the documents are considered to be inadequate, the IHL shall be required to provide further information before an evaluation is carried out. If the required information is not provided within a period of 3 months, it shall be deemed that the IHL no longer intends to conduct the programme.

6.9 Publication of Accreditation Status

ETAC shall regularly update the list of provisionally accredited (recommended for approval) and accredited programmes.

6.10 Procedures for Appeal

An IHL may appeal against a decision made by ETAC. The **notice** of appeal must be made in writing to the Accreditation Appeals Board within **2** weeks upon receiving the decision, stating the basis of the appeal. Appeal **documents** are to be submitted within **4** weeks after the above notice of appeal.

The Appeals Board shall be constituted by BEM. The number of members including the Chairman shall not be less than 3 comprising of independent members, including a representative of MQA.

If necessary, the Appeals Board may appoint a Special Committee, comprising members who are experienced in the accreditation process, to consider an appeal. Any expenses incurred shall be borne by the IHL.

The decision of the Appeals Board shall be forwarded to the IHL and MQA within 3 months from the receipt of the complete documents. The decision of the Appeals Board shall be final.

6.11 Confidentiality

Documents or other information obtained by the Evaluation Panel, ETAC staff, and ETAC members in connection with the accreditation exercise shall be treated as confidential.

6.12 Expenses

The IHL shall bear all the costs incurred for carrying out activities related to the approval and accreditation of a programme.

6.13 Conflict of Interest

Members of ETAC, Evaluation Panels, Appeals Board and ETAC staff are expected to be constantly aware of any conflict of interest. Members shall declare their interest or withdraw from any situation or activity that may constitute a conflict of interest.

7.0 Accreditation Procedure

This section describes ETAC's accreditation procedures from the process of application to the notification of accreditation result.

7.1 Application for Accreditation

The IHL should make an application for programme accreditation as per the requirements of Section 8 of the Standard to MQA and ETAC. Appendix C shows the process flow chart on Application for Accreditation and Approval of Engineering Technology Programmes.

For a new programme, the IHL should apply for accreditation at least **6 months** before the final examination of the first intake of students.

For a current accredited programme, the IHL should apply for re-accreditation at least **6 months** before the expiry date of the accreditation to avoid delay in graduates' registration with BEM.

The IHL applying for accreditation shall ensure that complete information is forwarded to ETAC. If the information submitted is found to be insufficient, the IHL shall be required to provide further information before an accreditation visit can be scheduled. The application will be deemed to have been withdrawn, if the requested information is not submitted within a period of **3 months**.

A cut-off period for submission of application for programme accreditation by IHL is twelve (12) months after graduation of any cohort, if the graduates are to be included in the accreditation decision.

7.2 Appointment of Evaluation Panel

On submission of all required documents, an Evaluation Panel shall be appointed as per Appendix A of this Standard. Members of the Evaluation Panel are selected on the basis of their expertise and standing in a particular discipline of engineering or engineering technology. Representatives from both the industry and academia may be appointed because of the perspective and experience that each area of endeavour can bring to the assessment of a programme, and to the maintenance of high professional standards.

The ETAC needs to ensure that not only high standards of academic teaching and achievement are being met, but also that the skills acquired and quality of graduates, are relevant to the practices and continued development of engineering technologist.

The Evaluation Panel needs to be aware of ETAC policies on accreditation as outlined in Section 6 of this Standard. The Evaluation Panel will assess all the accreditation criteria set forth in this Standard. The assessment includes obtaining objective evidence from documents submitted by the IHL, interviews and observation.

The Guidelines for Evaluation Panel (Appendix G) (Guidelines on Evaluation Panel Report) are useful tools for ensuring that every important aspect of a degree programme and its delivery are assessed and reported on.

7.3 Scheduling of a Visit

A visit is arranged and coordinated by the ETAC Secretariat on an appropriate date suitable to both the Evaluation Panel and the IHL. The visit should be held promptly after the appointment of the Evaluation Panel. It is important that as far as possible, the agreed dates of visit are adhered to.

7.4 Pre-Accreditation Visit Meeting

The Evaluation Panel should meet at least **once** before the actual accreditation visit takes place, in order to study and discuss documents, and systematically identify shortcomings. The Panel should strategically plan and/or request supplementary input from the IHL to fill the gaps. Any further information required should be communicated to the IHL through the ETAC. The Pre-Accreditation Visit Meeting is in addition to the meeting on Day (-1) (see *Guidelines for Evaluation Panel- Appendix G*).

7.5 Accreditation Visit

The accreditation visit will normally be scheduled for a period of two days. The overall conduct of the visit shall be managed by the ETAC. A typical schedule of the visit is given in item 3 of Guidelines for Evaluation Panel of this Standard (Appendix G). The visit shall include but not be limited to the following:

a. Opening meeting with the programme administrators
b. Meeting with staff members
c. Meeting with students
d. Meeting with external stakeholders such as alumni, employers, and industry advisor

e. Visiting and checking of facilities
f. Checking relevant documents
g. Exit meeting with programme administrators

Meetings with all stakeholders are important as this would give an indication of their involvement in the CQI process of the programme.

7.6 Report and Recommendation

The report, prepared in accordance with Appendix D, by the Evaluation Panel shall be submitted to the ETAC within 4 weeks after the visit.

8.0 Qualifying Requirements and Accreditation Criteria

An engineering technology programme shall be assessed by ETAC to enable graduates of the programme to register as graduate engineering technologists with the BEM. The assessment involves a review of qualifying requirements of the IHL and an evaluation based on the following criteria:

Criterion 1 - Programme Educational Objectives
Criterion 2 - Programme Outcomes
Criterion 3 - Academic Curriculum
Criterion 4 - Students
Criterion 5 - Teaching and Support staff
Criterion 6 - Facilities
Criterion 7 - Quality Management Systems

The assessment process will involve two parts:

(i) Initial assessment of qualifying requirements.
(ii) Detailed assessment of the programme based on the accreditation criteria.

The qualifying requirements are meant to screen out programmes that do not meet the core requirements of the assessment criteria. Failure to meet any one of the qualifying requirements will mean that the programme shall not be assessed for accreditation.

There are 8 components of the qualifying requirements and each programme is expected to have all the components. These components are:

1 Minimum 140 SLT* credit unit. At least 100 SLT credit units shall be engineering or engineering technology courses, of which a minimum 50 SLT credit units shall be allocated for practice-oriented components in the technical and specialist area.
2 Final year project (8-12 SLT credit units)
3 Industrial training (minimum of 24 weeks)
4 Full-time Teaching staff (minimum of 8)
5 Staff: student ratio 1: 15 or better
6 External examiner's report (and availability of the process that requires a minimum of one report over two years)
7 Programme Educational Objectives
8 Programme Outcomes

**SLT - Student Learning Time
If the programme has met all the qualifying requirements, a detailed assessment of the programme based on the accreditation criteria as explained in the following sections will be carried out.

Interpretations to this section are provided in the Guidelines for Evaluation Panel (Appendix G) of this Standard.

8.1 Criterion 1: Programme Educational Objectives

An engineering technology programme seeking accreditation shall have published Programme Educational Objectives. The Programme Educational Objectives shall be the basis upon which the Programme Outcomes (Section 5.0) are formulated. The programme shall have a clear linkage between Programme Educational Objectives and Programme Outcomes. It is expected that important stakeholders especially from the industries provide inputs in the process of formulating the Programme Educational Objectives. There must be a documented and effective process, involving programme stakeholders, for the periodic review and revision of these program educational objectives.

8.2 Criterion 2: Programme Outcomes

An Engineering Technology programme for which accreditation is sought must respond to the following:-

(i) **Programme Outcomes:** The IHL/faculty shall have published Programme Outcomes that have been formulated considering items (i) to (xii) given in Section 5.0 above, and any added outcome that can contribute to the achievement of its stated Programme Educational Objectives. The various Programme Outcomes shall be considered in designing the curriculum as described in Section 8.3 (Criterion 3 – Academic Curriculum).

(ii) **Continual Improvement:** The programme must also regularly use appropriate, documented processes for assessing and evaluating the extent to which the Programme Outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the programme.

(iii) **Stakeholders Involvement:** The IHL/faculty shall provide evidence of stakeholder involvement with regard to (i) and (ii) above.

Note: Please refer to Guidelines for Evaluation Panel for interpretation of requirements in this section

8.3 Criterion 3: Academic Curriculum

The academic curriculum and curricular design shall strongly reflect the philosophy and approach adopted in the programme structure, and the choice of the teaching-learning (delivery) and assessment methods. The curricular approach, the

educational content and the teaching-learning and assessment methods shall be appropriate to, consistent with, and support the attainment or achievement of the Programme Outcomes.

A balanced curriculum shall include all technical and non-technical attributes listed in the Programme Outcomes, and shall have the balance between the essential elements forming the core of the programme and additional specialist or optional studies (electives).

Guidelines on academic programme outlined in this Standard provide essential elements and features, which combined together will render a programme acceptable for accreditation by ETAC.

The course structure and sequence of content shall be appropriate. Adequate time shall be allocated for each component of the content/course, including for elective courses.

Evidence shall be present to show that the contents are being updated to keep up with the scientific, technological and knowledge development in the field, and to meet the needs of society. For example, in order to address the demands of Industrial Revolution 4.0, the curriculum shall equip students with the knowledge and skills in the relevant areas to enable them to function meaningfully in their role in Industry 4.0. IHLs shall have mechanisms for regularly identifying topics of contemporary importance at local, national and global levels and topics that may not be adequately addressed in the curriculum.

Other contributing components to the curriculum such as a variety of teaching-learning (delivery) modes, assessment and evaluation methods shall be designed, planned and incorporated within the curriculum to enable students to effectively develop the range of cognitive and practical skills, as well as positive attitudes as required in the Programme Outcomes. The teaching and learning processes shall be reviewed from time-to-time to embrace contemporary industrial advancements.

The teaching-learning methods shall enable students to take full responsibility for their own learning and prepare them for life long learning.

The academic programme component must consist of a normally four-year duration of full-time-equivalent study with a minimum total of **140 SLT credit units** (not including units for remedial courses) made up as follows:

(a) A **minimum of 100 SLT credit units** shall be **engineering technology courses** consisting of engineering sciences, discipline core courses, design/projects, and industrial training appropriate to the student's field of study.

(b) The **remaining SLT credit units** shall include sufficient content of **general education component** (such as mathematics, computing, languages, general studies, co-curriculum, management, law, accountancy, economics, social sciences, etc.) that complements the technical contents of the curriculum.

The essential elements and features are identified for convenience under several headings, without implying that each is to be treated as a separate or isolated component. In general, the syllabus and curriculum content must be adequate in quality and quantity in terms of coverage and depth. Emphasis on the curriculum shall be placed on the understanding and acquisition of basic principles and skills of a

discipline, rather than detailed memorisation of facts. The curriculum shall also provide students with ample opportunities for analytical, critical, constructive, and creative thinking, and evidence-based decision making. The curriculum shall include sufficient elements for training students in rational thinking and research methods.

The curriculum content should cover the following:

(i) Applied mathematics, applied science, applied engineering principles, skills and tools (computing, experimentation) appropriate to the discipline of study;
(ii) Engineering practical components;
(iii) Integrated training in professional engineering practice, including management and professional ethics;
(iv) Laboratory work to complement the science, computing and engineering theory;
(v) Industrial training – training in engineering technology in a professional engineering-practice environment;
(vi) Industrial revolution-related skills, such as for Industry 4.0 needs– Artificial Intelligence, Internet of Things, Big Data Analytics, Augmented and Virtual Realities);
(vii) Exposure to engineering practice within the campus learning environment;
(viii) Relevant tutorial classes to complement the lectures; and
(ix) Final year project.

SLT Credit Units

The SLT credit unit used is based on the Student Learning Time (SLT) as defined in the Malaysian Qualifications Framework (MQF). The student learning time (SLT) defines that for every one credit hour specified, students need to spend 40 hours of learning. This was determined by considering the total amount of time available in a week, the time needed for personal matters, the time for rest and recreational activities, and the time for studying. For a course of three SLT credit units, students will have to spend 120 hours, which involves both face-to-face meetings (lectures/laboratory work/tutorials, etc.) and non-face-to-face activities. The programme shall calculate the SLT credit units based on the amount of time students spend in the lecture, tutorial, laboratory sessions, project work, problem-based learning, e-learning modules, discovery learning, and coursework projects and independent study accordingly.

For industrial training, the following shall be followed:

- The requirements for industrial training of a programme can be fulfilled in two approaches; the conventional and/or the Work-Based Learning.
- The conventional industrial training shall be adequately structured and evaluated to acquire appropriate competencies.
- Industrial training shall be for a minimum of 24 weeks and a maximum of 1 year.

SLT credit calculation for conventional industrial training

- One (1) credit is allocated for every two (2) weeks of training.

SLT credit calculation for WBL courses

- Work Based Learning (WBL): The total student learning hours allocated at the workplace is inclusive of the DL, IL, IG and assessment hours. The concept of ELT shall be given consideration in calculating the SLT and credits for WBL. It is estimated that about 80% of the time at work can be determined as ELT. Due to those considerations, SLT for WBL is calculated as described below:

- Effective Learning Time (ELT):

  i. Theory (Dependent Learning (DL) and Independent Learning (IL))
  ii. Industrial Guidance (IG)
  iii. Assessment (during work and outside work)

ELT = (Theory + Industrial Guidance + Assessment) X 80%
= (DL + IL + IG + Assessment) X 80%

Credits = Effective Learning Time (ELT) / 40 Malaysian Notional Hour
= ELT / 40

- FYP and design projects are encouraged to be implemented as WBL courses incorporated inside the industry placement period/s.

- The SLT credits may be accumulated in more than one industry placement period.

For final year project, the following guideline shall be followed:

- A final year project is subjected to a minimum of eight SLT credit units and a maximum of twelve SLT credit units.

Notes:

❑ **Tutorial**

Tutorial should be part and parcel of the programme so as to complement the lectures. A tutorial session should preferably not exceed 30 students at any one time.

❑ **Practical Learning**

Students should be able to practise engineering skills to complement engineering theory that is learnt through lectures. Practice-oriented learning experiences should engage students with the use of facilities, equipment and instrumentation reflective of current industry practice which will help in developing competence in executing

applied and experimental work. Students should work in groups, preferably not more than five in a group.

Throughout the programme, there should be adequate provision for laboratory or similar investigative work, which will develop in the students the confidence to deal with applied engineering problems.

- **Industrial Training**

Training in engineering practice will provide first-hand experience in an engineering-practice environment, outside the IHL. Familiarity with all common engineering technology processes is essential and training at a practical level to a wide variety of processes is required at a level appropriate to the students. Whilst it is clearly desirable for students to be properly trained for the skills involved, the central aim is to acquire craft skills. Clearly, many of the latest processes and large scale or costly operations can only be the subject of observation or demonstration, and visits to engineering works may be helpful in many such cases.

Industrial training is a key component of learning in an integrated academic curriculum. Due to its importance, the programme shall have a minimum of 24 weeks and a maximum of 1 year industrial training for each student. IHL shall put a strenuous effort to assist all students to gain placements of suitable quality.

- **Work-Based Learning (WBL)**

WBL is one of the industrial training approaches that provides students with authentic context for learning and real-life work experiences in an engineering environment. It is essential that the engineering environment must fulfil the aims and learning outcomes of the programme. The WBL course design integrates theory and industrial practices in the workplace. WBL courses consist of 4 components: Dependent Learning (DL), Independent Learning (IL), Industrial Guidance (IG), and Assessment all of which contribute to ELT and credits calculation.

- **Training in Engineering Practice**

Training in engineering practice shall also be integrated throughout the curriculum as it is a key. In addition, exposure to professional engineering or engineering technology practice may also be obtained through a combination of the following:

(i) lectures/talks by guest lecturers from industry;
(ii) Teaching staff with industrial experience;
(iii) courses on professional ethics and conduct;
(iv) industry visits;
(v) an industry-based final year project;
(vi) regular use of a logbook in which industrial experiences are recorded;
(vii) industry research for feasibility studies;
(viii) study of industry policies, processes, practices and benchmarks;
(ix) interviewing engineering and engineering technology practitioners;
(x) industry based investigatory assignments;

(xi) direct industry input and advice to problem solving and projects assessment; and

(xii) industrial case studies.

It is considered that there is no real substitute for first-hand experience in an engineering-practice environment, outside the IHLs. The ETAC advocates that all engineering-based Teaching staff acquire some exposure to such experience, in addition to the other elements suggested, and make efforts to assist all students gain placements of suitable quality.

- **Final Year Project**

The final year project, consisting of either industry-based or practice-oriented projects, can provide one of the best means of introducing a real professional approach to engineering studies and practices. For this reason, the use of projects as a vehicle for teaching and for integration of core areas is strongly encouraged throughout the programme.

It is a requirement of the programme to include a significant project in its later stages. The final year project is required to seek individual analysis and judgement, capable of being assessed independently from the work of others. The student is expected to develop techniques in literature review and information processing.

It is recommended that final year projects should also provide opportunities to utilise appropriate modern technology in some aspect of the work, emphasising the need for engineers to make use of computers and multimedia technology in everyday practice.

- **Design Projects**

Design projects shall include broadly-defined applied engineering problems and design systems, components or processes integrating core areas and meeting specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

8.4 Criterion 4: Students

The quality and performance of students, in relation to the Programme Outcomes is of utmost importance in the evaluation of an engineering technology programme.

Students intending to pursue engineering technology programmes shall have a good understanding of mathematics and natural sciences. The normal entry qualification may include:

Pass Sijil Tinggi Persekolahan Malaysia (STPM) or equivalent with minimum Grade C (CGPA 2.0) in Mathematics and ONE (1) relevant science subject

OR

Recognised Diploma in Engineering or Engineering Technology or equivalent with minimum CGPA 2.0

OR

Recognised related Technical/Vocational/Skills Diploma with minimum CGPA 2.0

OR
APEL A as prescribed by MQA based on appropriate justifications by the IHL

IHLs shall ensure that students, who do not meet the above criteria, undertake suitable remedial programmes in order to attain the equivalent entry qualification.

A programme shall have clear policies on credit transfer. IHLs must put in place the mechanism for credit transfer and exemption to allow alternative educational pathways.

A maximum of 50% of the total credit units is allowed for lateral (horizontal) credit transfer from a similar level accredited programme. A maximum 30% of total credit units is allowed for vertical credit transfer from diploma level to degree level. If the IHL, or IHLs in formal collaboration, have designed both programme curricula together to ensure continuity, coherence and completeness, the maximum transfer allowed is 50%.

Credit transfer as described above may include APEL C components as prescribed by MQA based on appropriate justifications by the IHL.

The programme shall provide the necessary teaching-learning environment to support the achievement of the Programme Educational Objectives and Programme Outcomes. The teaching-learning environment shall be conducive to ensure that students are always enthusiastic and motivated. The IHL shall provide necessary counselling services to students regarding academic, career, financial, and health matters.

Students shall not be over burdened with workload that may be beyond their ability to cope with. Adequate opportunities, such as involvement in co-curricular activities in student clubs, sports and campus activities, shall be provided for students to develop their character apart from academic development.

8.5 Criterion 5: Teaching and Support staff

It must be demonstrated that the teaching staff have the competencies to cover all areas of the programme, and are fully aware of the outcome-based approach to education. In addition, Teaching staff shall be sufficient in number and capability to accommodate student-staff interaction, advising and counselling, service activities, professional development, and interaction with practitioners and employers. This is to ensure the quality of the engineering technology programme and the attainment of its stated outcomes. As a guide, a viable engineering technology department would be expected to have a minimum of 8 full-time teaching staff in the particular engineering discipline.

Teaching staff shall have postgraduate degrees (Masters level or higher). However, a staff member with first degree and 5-year industrial/specialist experience with acceptable professional qualifications may be considered. 30% of the lecturers/instructors must have a professional/industrial/specialist certification or at least TWO (2) years of relevant industrial work experience. If this is not met, the institution should have a staff industrial attachment scheme in place.

The overall competence of the teaching staff may be judged by such factors as education, diversity of background, industrial experience, teaching experience, ability to communicate, enthusiasm for developing more effective programmes, level of scholarship, and participation in professional societies. The IHL should provide the opportunity to its staff to gain the necessary industrial experience.

The full-time equivalent teaching staff to student ratio shall ideally be 1:15 or better to ensure effective delivery, student-staff interaction, student advising and counselling, IHL service and industry activities, professional development and interaction with industries.

There shall also be sufficient, qualified and experienced technical and administrative staff to provide adequate support to the educational programme. It is recommended that each technical staff shall be in charge of not more than two laboratories.

Sharing lecturer between programmes is allowed, and will count for staff-student ratio and minimum teaching staff calculations based on FTE guidelines.

Part time staff from industry is encouraged, and will counted for staff-student ratio calculations based on FTE guidelines.

8.6 Criterion 6: Facilities

The quality of the environment in which the programme is delivered is regarded as paramount to providing the educational experience necessary to accomplish the Programme Outcomes.

There must be adequate teaching and learning facilities such as classrooms, learning support facilities, study areas, information resources (library), computing and information-technology systems, laboratories and workshops, and associate equipment to cater for multi-delivery modes.

Since engineering technology programme requires substantial practice-oriented learning, sufficient and appropriate experimental and practical facilities must be available for students to gain substantial experience in practice-oriented learning as well as in understanding and operating engineering equipment and of designing and conducting experiments. The equipment must be reasonably representative of modern engineering practice. Where practice-oriented learning is undertaken at another institution, or in industry, arrangements must be such as to provide reasonable accessibility and opportunity for learning. IHLs must ensure that all facilities are maintained and adhere to best practices in safety, health and environment where appropriate.

For programmes offered at multiple or remote locations, facilities must be sufficient to support student learning, equivalent to those provided for on-campus students.

Support facilities such as hostels, sport and recreational centres, health centres, student centres, and transport must be adequate to facilitate students' life on campus and to enhance character building.

8.7 Criterion 7: Quality Management Systems

The IHL and the faculty must ensure that there exists a quality management system to oversee and monitor the overall achievement of the programme objectives. These include the controlling, managing, directing, organising and supervising of the overall management system of the IHL. It must have adequate arrangements for planning, development, delivery and review of engineering technology programmes together with the academic and professional development of its staff.

8.7.1 Institutional Support, Operating Environment, and Financial Resources

The IHL must regard quality engineering technology education as a significant and long-term component of its activity. This would most commonly be reflected in the IHL's vision and mission statements and strategic plans. In addition, institutional support may be reflected in the constructive leadership, adequate policies and mechanisms for attracting, appointing, retaining and rewarding well-qualified staff and providing for their ongoing professional development; and for providing and updating infrastructure and support services. It must ensure that creative leadership is available to the IHL through the appointment of highly qualified and experienced senior staff in sufficient numbers.

The development of teaching staff, in particular, through opportunities for further education, industrial exposure, as well as research and development, is of utmost importance for the sustainability and quality improvement of the programme.

Opportunities for the development of support staff should also be provided. The IHL shall provide sound policies, adequate funding and infrastructure for this purpose. Financial resources must be adequate to assure the overall quality and continuity of the engineering technology programme. The IHL must have sufficient financial resources to acquire, maintain, and operate facilities and equipment appropriate for the engineering technology programme.

8.7.2 Programme Quality Management and Planning

The IHL's processes for programme planning, curriculum development, and regular curriculum and content review must involve all Teaching staff. The processes include reviewing Programme Educational Objectives and Programme Outcomes, tracking performance assessment processes, reviewing the comments from External Examiners, reviewing feedback and inputs from stakeholders including students and alumni. The process of continual quality improvement shall be implemented with full accountability. For a new programme, the processes surrounding the decision to introduce the programme should be established.

Programme(s) via various modes and at different locations, such as, full-time, franchised, twinning, part-time, distance learning, joint degree and multi campus may be conducted. The IHL awarding the degree shall be responsible for ensuring the quality and management of these programmes.

8.7.3 External Assessment and Advisory System

The IHL shall have an external examiner for each programme to independently review the overall academic standard as shown in Appendix E (External Examiner's Report) of this Standard.

The external examiner is a person of high academic standing in the relevant engineering discipline and preferably with substantial industry experience. The external examiner is expected to carry out the overall assessment of the programme including staff as well as all courses and laboratory work undertaken by the students. Assessment is to be made at least once every two years.

The IHL shall have an industry advisory system for participation by practicing engineers or engineering technologists, and employers of engineer technologists for the purpose of planning and continuous improvement of programme quality. These industry advisors shall be expected to provide inputs and recommendation on an on-going basis through participation in discussion and forums.

The external examiner's report and feedback from industry advisors shall be used for continual quality improvement.

8.7.4 Quality Assurance

A quality management system must be in place to assure the achievement of Programme Outcomes. The IHL shall maintain its quality management system, based on an established quality assurance standard, for example, ISO 9001 Quality Management System, or other quality assurance systems and benchmarking. The quality assurance processes should include, among others:

(a) Student admission
(b) Teaching and learning
(c) Assessment and evaluation which include:
- examination regulations and criteria for pass/fail
- preparation and moderation processes
- level of assessment
- assessment processes including final year project/industrial training

8.7.5 Safety, Health and Environment

The IHL shall demonstrate that it has in place, a system for managing and implementation of safety, health and environment. Safety culture is of utmost importance, and among a major factor affecting accreditation decision. The IHL shall demonstrate activities to inculcate safety culture among the staff and students and comply with any or all applicable rules or regulations pertaining to safety, health and environment.

9.0 Accreditation Documents

9.1 Introduction

The IHL applying for accreditation must submit documents that provide accurate information and sufficient evidence for the purpose of evaluation. It should not be necessary to develop extensive documentation specifically for accreditation evaluation, since the purpose of accreditation is to evaluate the systems already in place.

For each programme to be accredited, unless otherwise stated, the IHL shall submit the following documents:

i. Self-Assessment Report (as noted in Section 9.2 of this Standard) – Digital Format
ii. Supporting Material Document (as noted in Section 9.3 of this Standard) – Digital format including details of the syllabus.
iii. Appendix F (Checklist of Documents for Accreditation/Approval of New Programme and Relevant Information)

Institutional Documents and Additional Documentation (as noted in Section 9.4) are to be made available during the visit.

9.2 Self Assessment Report – Digital Format

A Self-Assessment Report is an account of the IHL's plan, implementation, assessment and evaluation of the programme conducted. It reflects the processes with results obtained used in continual quality improvement at all levels of the programme's activities. This appropriately bound document, ranging between 50 – 100 pages with all pages numbered and a table of contents, shall provide the information and description about the programme to enable the Evaluation Panel to objectively assess the programme for the purpose of accreditation or approval. The emphasis shall be on qualitative description of each aspect and criterion, and how these meet the standards and expectation as set out in this Standard.

In other words, this summary document is a form of Self-Assessment of the IHL's programme.

The general structure of the Self-Assessment Report shall follow the guidelines as described in Sections 9.2.1 to 9.2.9 in conjunction with Appendix F of this Standard. Appendix G provides some prescribed formats for the information.

The submission must be comprehensive, easily readable, free standing, and provide a coherent overview with the text addressing each major point in a definitive manner. It must be concise but in sufficient depth and detail in conjunction with the supporting information to appropriately represent the programme. It will not be sufficient to merely provide a collection of disparate items, or point to a web site, and leave the ETAC to find the relevant information.

The IHL is advised to provide accurate information as required by the Accreditation Standard, since the Evaluation Panel will verify the information during the visit.

9.2.1 General

(i) Provide general information on the IHL and on the specific programme and attach the IHL academic calendar.

(ii) Provide detailed information on programme history of accreditation (year of accreditation, conditions imposed and actions taken).

(iii) Describe any self-initiated changes made to programme stating the year the changes were introduced.

9.2.2 Programme Educational Objectives

(i) State the vision and mission of the IHL/faculty.

(ii) Describe the Programme Educational Objectives and state where are they published.

(iii) Describe how the Programme Educational Objectives are consistent with the vision and mission of the IHL/faculty and stakeholders requirements.

(iv) Describe the processes used to establish the Programme Educational Objectives, and the extent to which the programme's various stakeholders are involved in these processes.

(v) Describe the process for the periodic review and revision of these Programme Educational Objectives.

9.2.3 Programme Outcomes

(i) List down the Programme Outcomes and state where are they published.

(ii) Describe how the Programme Outcomes relate to the Programme Educational Objectives.

(iii) Describe how the Programme Outcomes encompass the outcome requirements of Section 5.0 of this Standard.

(iv) Describe the processes used to establish and review the Programme Outcomes, and the extent to which the programme's various stakeholders are involved in these processes.

(v) Describe the data gathered and explain the results of the assessment.

(vi) Explain how the assessment results are applied to further develop and improve the programme.

(vii) Describe the materials, including student work and other tangible materials that demonstrate achievement of the Programme Outcomes.

9.2.4 Academic Curriculum

(i) Discuss the programme structure and course contents to show how they are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the Programme Outcomes.

(ii) Discuss the programme delivery and assessment methods and how these are appropriate to, consistent with, and support the development of the range of intellectual and practical skills and attainment or achievement of the Programme Outcomes.

(iii) The information required in items (i) and (ii) should include but is not limited to the following:

- A matrix linking courses to Programme Outcomes to identify the contribution of each course to the Programme Outcomes.
- Distribution of the engineering technology courses (with industrial training and WBL courses).
- Distribution of the ~~(~~general education~~)~~ courses.
- Distribution of the courses offered according to semester.

Note: Samples of table formats are available in Appendix G.

9.2.5 Students

(i) Discuss the requirement and process for admission of students to the programme.

(ii) Discuss the policies and processes for credit transfer/exemption.

(iii) Discuss students' performance in relation to Programme Outcomes.

(iv) Discuss students' workload.

(v) Discuss students' activities and involvement in student organisations that provide experience in management and governance, representation in education and related matters and social activities.

(vi) The information required in items (i) to (v) should include but is not limited to the following:

- The distribution of students' enrolment for all academic years for the past four years (Table 6 in Appendix G).
- The entry qualifications of final year students of the current semester (Table 7 in Appendix G).

9.2.6 Teaching and Support Staff

(i) Discuss the strength and competencies of the teaching staff/ WBL industry mentor in covering all areas of the programme, and in implementing the outcome-based approach to education.

(ii) Discuss how the overall staff workload enables effective teaching, student-staff interaction, student advising and counselling, IHL service and research activities, professional development and interaction with industry.

(iii) Discuss the sufficiency and competency of technical and administrative staff in providing adequate support to the educational programme.

(iv) The information required in items (i) to (iii) should include but is not limited to the following:

- A breakdown in terms of numbers of teaching staff (full-time, part-time and inter-programme) by year for the past four years (Table 8 in Appendix G).
- An analysis of all Teaching staff (Table 9 in Appendix G).
- A summary of the academic qualifications of teaching staff (Table 10 in Appendix G).
- A summary of the professional/industrial/specialist certifications and membership in professional bodies/societies of teaching staff (Table 11 in Appendix G).
- A summary of the posts held by full time teaching staff (Table 12 in Appendix G).
- A summary of teaching workload of teaching staff for the current semester (Table 13 in Appendix G).
- An analysis of all support staff (Table 14 in Appendix G).
- A summary of the posts held by support staff (Table 15 in Appendix G).
- The staff: student ratio by year for all academic years for the past four years (Table 16 in Appendix G).
- A listing of lecturers/invited speakers from industry/public bodies and their level of involvement.

9.2.7 Facilities

(i) Discuss the adequacy of teaching and learning facilities such as classrooms, learning-support facilities, study areas, information resources (library), computing and information-technology systems, laboratories and workshops, and associated equipment to cater for multi-delivery modes.

(ii) For programmes offered wholly or partly in distance mode, or at multiple or remote locations, describe how the facilities provided are equivalent to those provided for on-campus students.

(iii) Describe the adequacy of support facilities such as hostels, sport and recreational centres, health centres, student centres, and transport in facilitating students' life on campus and enhancing character building.

(iv) The information required in items (i) to (iii) should be provided in the supporting documents but is not limited to the following:

- A summary, in tabulated form, of the lecture facilities (give number, capacity, and audio video facilities available).
- A summary, in tabulated form, of the laboratories (list down the equipment available in each laboratory).
- A summary, in tabulated form, of the workshops (list down the equipment/machinery available in each workshop).
- A summary, in tabulated form, of the computer laboratories (list down the hardware and software available).
- A summary, in tabulated form, of the other supporting facilities such as the library (list down the titles of books/journals/magazines/standards of relevance to the programme).
- A summary, in tabulated form, of recreational facilities.
- A summary, in tabulated form, of information on recent improvements and planned improvements in these facilities.

9.2.8 Quality Management Systems

(i) Outline the organisational structure of the IHL as well as the structure within the faculty/department/programme. Discuss the level and adequacy of institutional support, operating environment, financial resources, constructive leadership, policies and mechanisms for attracting, appointing, retaining and rewarding wellqualified staff and provision of professional development, and provision of infrastructure and support services to achieve Programme Objectives and assure continuity of the programme. All relevant policies are to be made available during the visit.

(ii) Discuss the mechanism for the following: programme planning; curriculum development; curriculum and content review; responding to feedback and inputs from stakeholders including industry advisors, partner industry for WBL training (if applicable), students and alumni; tracking outcomes of performance through assessment; responding to External Examiners comments; reviewing of Programme Educational Objectives and Programme Outcomes; and continual quality improvement. Where these are discussed elsewhere in the report, specify their locations. For a new programme, the IHL also needs to discuss the processes surrounding the decision to introduce the programme.

(iii) Summarise responses to the external examiner's report.

(iv) Discuss how the quality management system of the IHL provides quality assurance and benchmarking.

(v) The information required in items (i) to (iv) should be provided in the supporting document and is not limited to the following:

- Evidence on the participation of Teaching staff, support staff and students in the continual quality improvement process.

- Evidence on the development of Teaching staff through opportunities in further education, industrial exposure, as well as research and development.

- Policies, internal processes and practices that are in place at all levels within the IHL relating to the five criteria as stated in Section 8 of this Standard.

- Evidence of the on-going participation of industry advisors in discussions and forums, professional practice exposure, and collaborative projects.

9.2.9 Other Relevant Information

Include additional information which supports the continuing progress and visibility of the programme, such as major research accomplishments.

9.3 Supporting Material Document – Digital Format

This document is to provide supporting material for the programme in digital format (softcopy) as follows:

9.3.1 Supporting Information

Provide additional information on the IHL, faculty/school/department, and programme not provided in the summary material document.

9.3.2 Teaching and Laboratory Support Staff

Provide no more than a two-page CV for each staff member.

9.3.3 Programme Structure and Contents

Provide evidence of the use of tutorials and non-conventional delivery methods such as Problem Based Learning (PBL) techniques alongside traditional lectures.

Provide a summary of the industrial training schemes, and the list of companies involved.

Provide and evidence of activities relevant to industry exposure.

9.3.4 Equipment, Software, Title of Books and Journals

Provide a listing of all equipment and software used by the programme including recent additions and planned additions, as well as the supporting title of books, and journals for the programme.

9.3.5 External Examiner and Advisory Board

Provide the external examiner reports and reports/minutes from advisory board meetings.

9.4 Institutional Documents and Additional Documentation to be Made Available During the Visit

The following items, which are evidences to support the information requested in Sections 9.2 and 9.3 above) shall be made available during the visit:

9.4.1 IHL Documents

Provide the Handbook, Calendar supplement, or other official publication relating to the faculty/school/department, and containing the statement of programme details; IHL prospectus; and any other documents that relate to the faculty/school/department, and programme.

9.4.2 Documents Related to Programme Objectives and Outcomes

Provide all relevant documents and evidences related to Programme Objectives and Programme Outcomes (one copy) as follows:-

(i) course files – for every course offered by the programme, provide the course information to include the targeted course learning outcomes, a matrix linking course outcomes to programme outcomes, course synopsis/syllabus, and a list of references (texts used). Final examination papers complete with answer scheme and graded examination papers with low, medium and high grades are also to be provided.

(ii) Any information with regard to other learning activities and assessment measures such as projects, quizzes, tutorial questions, assignments, class projects, copies of the course notes (optional), and any other materials used for the course are also to be included. For laboratory courses, provide a copy of the syllabus, experiment instruction sheets, as well as supporting information.

(iii) objectives and outcomes assessment instruments – supporting documentation for objectives and outcomes assessment including sample questionnaires, portfolios, survey forms, video recordings, etc.

(iv) all evidences related to CQI of the programme.

(v) other relevant documents (if any).

9.4.3 Final Project Reports

For sample students, provide a copy of the final project report, instruction sheets, and grade sheets or other evaluations for the project.

Provide the listing of final project titles for the past few years.

9.4.4 Industrial Training Reports

For sample students, provide a copy of the training report, guidelines for the training, reviews by the industry sponsors as well as the faculty mentors.

9.4.5 Laboratory Reports

For sample students, provide a copy of the laboratory reports, instruction sheets, and grade sheets or other evaluations for the project laboratory report.

9.4.6 Quality Assurance Records

Provide minutes and records of action and improvement for meetings of the programme teaching team, Industry Advisory Committee, staff-student consultation forums.

9.4.7 Other Documentation

Provide any other documentation that might help the Evaluation Panel in the assessment of the programme.

10.0 Approval Procedure for a New Engineering Technology Programme

10.1 ETAC's Initial Evaluation

The evaluation procedure at this stage shall comprise the following steps:

(a) Application for Approval to Conduct a New Degree Programme

The IHL intending to conduct a new programme shall obtain approval from the relevant authorities.

The IHL should submit the complete set of documents (refer to Section 9 and Appendix G) to MQA and ETAC (refer to Appendix C for process) for initial evaluation by ETAC. The recommendation from ETAC will be forwarded to the relevant authorities.

When the documents are considered to be inadequate, the IHL shall be required to provide further information before an evaluation is carried out. If the required information is not provided within three (3) months, it shall be deemed that the IHL no longer intends to conduct the programme.

(b) Initial Evaluation

ETAC shall appoint an Evaluation Panel to evaluate the proposed programme.

The evaluation shall cover the following areas:

(i) general awareness of current development in engineering education and engineering practice;
(ii) the stated Programme Educational Objectives and Programme Outcomes;
(iii) the course content;
(iv) the quality of staff, the educational culture;
(v) the teaching facilities;
(vi) the library/resource centre;
(vii) the IHL's quality systems and processes;
(viii) the assessment procedure and examination rules; and
(ix) other related activities.

The evaluation may include a visit to the IHL by the Evaluation Panel.

10.2 Report and Recommendation

The report from the Evaluation Panel shall be submitted to ETAC within 4 weeks after the appointment/visit.

10.3 ETAC's Decision

Based on the evaluation, ETAC may decide on one of the following:

- to recommend approval of the programme to be conducted
- to recommend conditional approval for the programme to be conducted with the provision that the IHL takes certain actions to rectify all the shortcomings indicated in the report within a specified period as determined by ETAC
- not to recommend approval.

The recommendation from ETAC is specific to the programme, location and mode of study. Where the same programme is offered by the IHL at different locations and/or via different modes of delivery, the IHL shall make a separate application for each of the programmes.

10.4 Provisional Accreditation

Approved programme will be accorded provisional accreditation by BEM.

REFERENCES

This Standard has been developed based on information and practices from the following documents:

Engineering Accreditation Standard 2012, Engineering Accreditation Council, accessed from the website at www.**eac**.org.my/web/document/**EACStandard2012**.pdf

Engineering Accreditation Standard 2017, Engineering Accreditation Council, accessed from the website at http://www.eac.org.my/web/document/Full%20Version%20of%20EAC%20Standard%202017ed.pdf

Programme Standards: Engineering and Engineering Technology (2012), Malaysian Qualifications Agency, accessed from the website at http://www.mqa.gov.my/portal2012/garispanduan/standard%20kejuruteraan_bm.pdf

Malaysian Qualifications Agency. (2015*). Guidelines To Good Practices: Work Based Learning (GGP: WBL)*. Petaling Jaya, Malaysia.

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APPENDIX A

ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL, EVALUATION PANEL AND ACCREDITATION APPEALS BOARD

1.0 ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL

Engineering Technology Accreditation Council (ETAC) is the body delegated by BEM for accreditation of engineering technology and engineering technician programmes. ETAC shall be an independent body for the accreditation of engineering technology and engineering technician programmes.

The policy on accreditation of engineering programmes is laid down by ETAC and is subject to changes as deemed necessary by ETAC. Implementation of the policy is the responsibility of the ETAC.

Members of ETAC shall be appointed by BEM as follows:

a) A Chairman (nominated by BEM)

b) A Deputy Chairman (nominated by BEM from IHL producing Engineering Technologists and Engineering Technicians or any related body).

c) 1 MQA representative

d) 18 members representing each of major branches of engineering technology (e.g. Civil, Mechanical, Electrical, Chemical and Electronics) and each of the constituent organisations nominated by BEM, learned societies, and any related bodies.

   (i) member(s) nominated by BEM, of which minimum 2 from IHLs producing Engineering Technologists and/or Engineering Technicians
   (ii) member(s) from relevant learned societies
   (iii) member(s) from related Ministry
   (iv) member(s) from related government agency
   (v) member(s) from the industry employers of Engineering Technologists and Engineering Technicians in Malaysia
   (vi) public representative(s)

e) Ex-Officio: Registrar of BEM
   Secretary of BEM

The ETAC shall comprise persons from academic institutions and industries, with a minimum of 50% from industries. In appointing the members of ETAC, BEM shall maintain a reasonable spread of expertise across various branches of engineering technology disciplines.

The final decision on the membership of the ETAC is with the BEM.

The terms of reference of the ETAC shall be as follows:

1. Formulate and update the accreditation policies and criteria.
2. Approve detailed guidelines and operating procedures for accreditation.
3. Oversee all operational arrangements, and appoint members of the Evaluation Panel.
4. Receive evaluation report on engineering technology and engineering technician programmes, and decide whether accreditation should be granted or otherwise.
5. Establish and maintain a list of local and foreign accredited engineering technology and engineering technician programmes.
6. Respond to any complaints or appeals concerning the accreditation process and to any proposals for change.
7. Oversee the development and operation of accreditation and mutual recognition of programmes with other countries.
8. Keep the BEM informed of the activities of ETAC and where necessary make recommendations to the Board.
9. Foster the dissemination of developments and best practices in engineering technology and engineering technician education.
10. Advice the BEM on public statements or representations that should be made in relation to engineering technology education.
11. Hold consultation meetings with IHLs as and when necessary.
12. Hold meetings at least 6 times per year.
13. Propose additional ETAC members if necessary.

2.0 EVALUATION FOR APPROVAL TO CONDUCT A NEW PROGRAMME

The ETAC shall appoint an evaluation panel to assess the application. The person should have extensive academic experience and/or industrial experience**.**

3.0 EVALUATION PANEL FOR ACCREDITATION

The Evaluation Panel shall be appointed by ETAC and normally consists of:

- A Chairperson; and
- One or two members,

All members are typically chosen for their broad experience in engineering/engineering technology/technician education and their ability to evaluate the generic programme outcomes and quality systems. The Evaluation Panel should include at least one member with extensive academic experience, and one member with extensive industry experience. All members must be chosen from fields related to the programme being evaluated.

4.0 ACCREDITATION APPEALS BOARD

The Appeals Board shall be constituted by BEM. The number of members including the Chairman shall not exceed 5 comprising of independent members. The Chairman shall be nominated by BEM among the 5 independent members.

If necessary, the Accreditation Appeals Board may appoint a Special Committee, the members of which must be experienced in the accreditation process, to consider an appeal. Any expenses incurred shall be borne by the IHL making the appeal.

The decision of the Accreditation Appeals Board shall be final.

APPENDIX B

(a) Definition of Broadly-Defined Problem Solving

The range of broadly-defined engineering problem as required by the Programme Outcomes in Section 5.0 is defined as follows:

No.	Attribute	Broadly-defined Engineering Problems have characteristic SP1 and some or all of SP2 to SP7:
1	Depth of Knowledge Required	SP1: Cannot be resolved without engineering knowledge at the level of one or more of SK 4, SK5, and SK6 supported by SK3 with a strong emphasis on the application of developed technology
2	Range of conflicting requirements	SP2: Involve a variety of factors which may impose conflicting constraints
3	Depth of analysis required	SP3: Can be solved by application of well-proven analysis techniques
4	Familiarity of issues	SP4: Belong to families of familiar problems which are solved in well-accepted ways
5	Extent of applicable codes	SP5: May be partially outside those encompassed by standards or codes of practice
6	Extent of stakeholder involvement and level of conflicting requirements	SP6: Involve several groups of stakeholders with differing and occasionally conflicting needs
7	Interdependence	SP7: Are parts of, or systems within complex engineering problems

(b) Range of Engineering Activities

The range of **broadly-defined engineering activities** is defined as follows:

No.	Attribute	Broadly-defined activities
	Preamble	Broadly-defined activities means (engineering) activities or projects that have **some or all** of the following characteristics:
1	Range of resources	TA1: Involve a variety of resources (and for this purposes resources includes people, money, equipment, materials, information and technologies)
2	Level of interactions	TA2: Require resolution of occasional interactions between technical, engineering and other issues, of which few are conflicting
3	Innovation	TA3: Involve the use of new materials, techniques or processes in non-standard ways
4	Consequences to society and the environment	TA4: Have reasonably predictable consequences that are most important locally, but may extend more widely
5	Familiarity	TA5: Require a knowledge of normal operating procedures and processes

(c) Knowledge Profile**

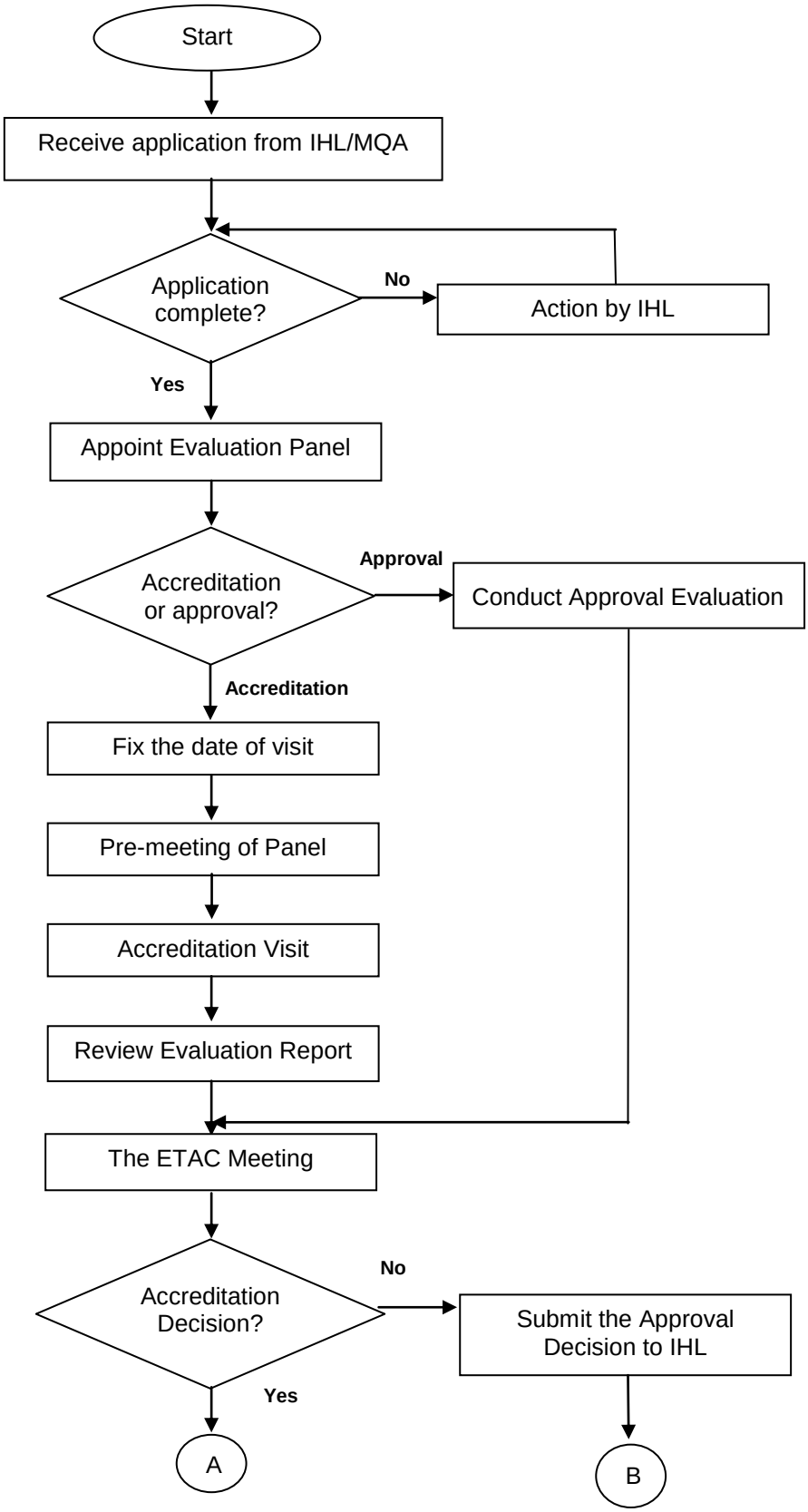
The curriculum shall encompass the **knowledge profile** as summarised in the table below:

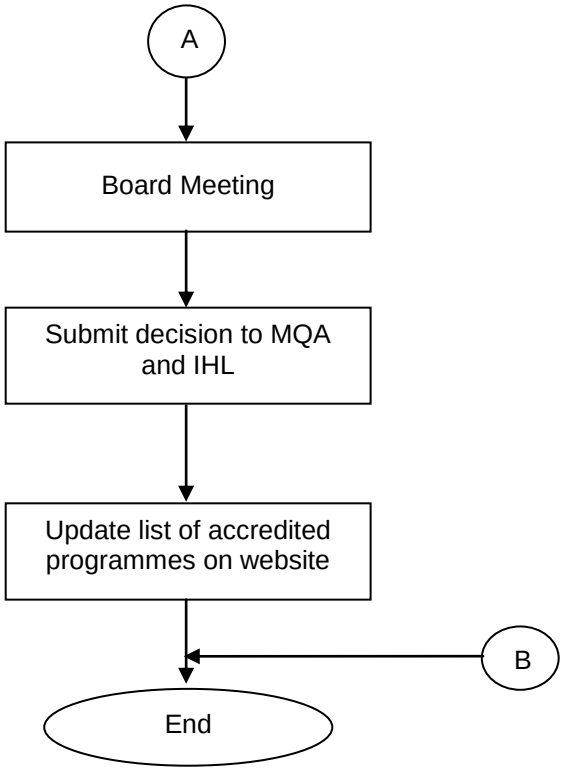
** A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 4 years of study.

SK1: A systematic, theory-based understanding of the **natural sciences** applicable to the sub-discipline
SK2: Conceptually-based **mathematics**, numerical analysis, statistics and aspects of computer and information science to support analysis and use of models applicable to the sub-discipline
SK3: A systematic , theory-based formulation of **engineering fundamentals** required in an accepted sub-discipline
SK4: Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for an accepted sub-discipline
SK5: Knowledge that supports **engineering design** using the technologies of a practice area
SK6: Knowledge of **engineering technologies** applicable in the sub-discipline
SK7: **Comprehension of** the role of technology in society and identified issues in applying engineering technology: ethics and impacts: economic, social, environmental and sustainability
SK8: Engagement with the **technological literature** of the discipline

APPENDIX C

PROCESS FLOW CHART FOR APPLICATION OF ACCREDITATION AND APPROVAL OF ENGINEERING TECHNOLOGY PROGRAMME





Notes:

1) a) Application for Recommendation for Approval to conduct an engineering technology programme is to be submitted before offering the engineering technology programme.

b) Approval to conduct any engineering technology programme does not guarantee full accreditation. The faculty needs to apply for accreditation of the programme as specified in the ETAC Standard.

2) For programmes offered outside of Malaysia, the ETAC will use the accredited list by the professional engineering body of the home country as a guide.

APPENDIX D

ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL

Evaluation Panel Report

Name of IHL:

Programme for Accreditation:

General Remarks

A QUALIFYING REQUIREMENTS

1	Minimum 140 SLT credit units of which 100 SLT credit units must be engineering or engineering technology courses	YES/NO
2	Final year project (8-12 SLT credit units)	YES/NO
3	Industrial training / WBL (minimum of 24 weeks)	YES/NO
4	Minimum of 8 full-time teaching staff	YES/NO
5	Teaching Staff: student ratio of 1:15 or better	YES/NO
6	External examiner's report	YES/NO
7	Programme Educational Objectives	YES/NO
8	Programme Outcomes	YES/NO

B ASSESSMENT

***** Delete where applicable

ASSESSMENT CRITERIA

1 CRITERION 1: PROGRAMME EDUCATIONAL OBJECTIVES

Comments/Remarks on Programme Educational Objectives: The Evaluation Panel shall comment on the appropriateness of the Programme Educational Objectives as required by Section 4.0 and 8.1 of the Standard.

1.1 General Observations:

Performance Indicators	
Statements are well-defined, measurable and achievable	YES ☐ NO ☐ Remarks:
Statements are well published and publicised	YES ☐ NO ☐ Remarks:
Clear linkage between Programme Educational Objectives and Programme Outcomes	YES ☐ NO ☐ Remarks:
A documented and effective process, involving programme stakeholders, for the periodic review and revision	YES ☐ NO ☐ Remarks:
Assessment of performance available and subsequent CQI indicated.	YES ☐ NO ☐ Remarks:

2 CRITERION 2: PROGRAMME OUTCOMES

Comments/Remarks on Programme Outcomes: The Evaluation Panel shall comment on the appropriateness of the Programme Outcomes as well as the Processes and Results as required by Section 5.0 and 8.2 of the Standard.

2.1 Observation on Programme Outcomes:

2.2 Observation on Processes and Attainment:

2.3 Observation on Stakeholder Involvement:

Overall Comments/Remarks: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

3 CRITERION 3: ACADEMIC CURRICULUM

3.1 SLT Credit Units

(a) Total number of SLT credit units

(b) Number of SLT credit units for engineering technology courses

(c) Number of SLT credit units for other related general education courses

3.2 The Curriculum

(a) Programme Structure, Course Contents, and Balanced Curriculum

Observation

(b) Programme Delivery and Assessment Methods

Observation
DELIVERY ASSESSMENT

(c) Practice-oriented components

Observation

(d) Final-Year Project

Observation

(e) Industrial Training / WBL

Observation

(f) Training in Engineering Practice

Observation

Comments/Remarks/Recommendations: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

4 CRITERION 4: STUDENT

4.1 Student Admission

(a) Entry requirements (Academic)

Students entering (entry requirements) the programme followed the criteria set in the standard with adequate mathematics and natural sciences or their equivalent.	YES ☐ NO ☐ Remarks:
Programme ensured that students, who do not meet the above criteria, undertake suitable remedial programmes in order to attain the equivalent entry qualification.	YES ☐ NO ☐ Remarks:

(b) Transfer Policy/Selection Procedures/Appropriateness of arrangements for Exemptions from part of the programme

Programme has clear policies on credit transfer/credit exemptions.	YES ☐ NO ☐ Remarks:

4.2 Student Development

	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Number of students interviewed				

(a) Student counselling

The IHL has counselling unit/section /department with qualified counsellor(s).	YES ☐ NO ☐ Remarks:

Programme monitors and evaluates student performance, advice and counsel students regarding academic and career matters, as well as provide assistance in handling health, financial, stress, emotional and spiritual problems.	YES ☐ NO ☐ Remarks:

(b) Workload

Students workload is not burdensome.	YES ☐ NO ☐ Remarks:

(c) Enthusiasm and motivation

The teaching-learning environment is conducive.	YES ☐ NO ☐ Remarks:
Students have avenues to provide feedback and suggestions about the programme	YES ☐ NO ☐ Remarks:

(d) Co-curricular activities

Programme ACTIVELY encourages student participation in activities that provide experience in management and governance.	YES ☐ NO ☐ Remarks:

(e) Observed attainment of Programme Outcomes by students

Comments/Remarks/Recommendations: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

5 CRITERION 5: TEACHING AND SUPPORT STAFF

5.1 Teaching Staff

	< 1 YEAR	1-5 YEARS	6-10 YEARS	> 10 YEARS
Number of teaching staff interviewed				

(a) Number and Competency of Teaching staff/ WBL industry mentor

Total number of academic staff teaching the programme	
All eligible staff are registered with BEM	YES ☐ NO ☐ Remarks:
Academic staff is sufficient in number and competencies to cover all curricular areas.	YES ☐ NO ☐ Remarks:
Academic staff have the education, diversity of background, engineering experience, teaching experience.	YES ☐ NO ☐ Remarks:
Academic staff have the ability to communicate, enthusiasm for developing more effective programmes, level of scholarship.	YES ☐ NO ☐ Remarks:
Academic staff participate in professional societies or as members of Learned Bodies	YES ☐ NO ☐ Remarks:

(b) Qualification, industrial experience & development

Total number of academic staff teaching the programme with professional/industrial/specialist certificates or at least 2 years of relevant industrial work experience	
Total number of academic staff with PhD qualification.	
Total number of academic staff with MSc qualification.	

(c) Research/publication/consultancy

Academic staff are given opportunities to conduct research and do consultancy.	YES ☐ NO ☐ Remarks:

(d) Industrial involvement

Academic staff are given provision to undergo industrial attachment.	YES ☐ NO ☐ Remarks:
Academic staff are involved in appropriate professional/learned bodies providing services towards the development of the entity.	YES ☐ NO ☐ Remarks:

(e) Teaching load/contact hours

Average teaching hours per week is less than 15	YES ☐ NO ☐ Remarks:

(f) Motivation and enthusiasm

Academic staff know that IHL has adequate policies and mechanisms for retaining and rewarding well-qualified staff.	YES ☐ NO ☐ Remarks:
Academic staff are satisfied and motivated with their work environment.	YES ☐ NO ☐ Remarks:

(g) Use of lecturers from industry/public bodies

Academic staff organise industry talk towards enhancing students' learning activities.	YES ☐ NO ☐ Remarks:

(h) Awareness of the Outcome-Based approach to education

Academic staff understand and implement OBE in the teaching and learning of the programme.	YES ☐ NO ☐ Remarks:

5.2 Support Staff (Laboratory and Administration)

	< 1 YEAR	**1-5 YEARS**	**6-10 YEARS**	**> 10 YEARS**
Number of support staff interviewed				

(a) Qualification and experience

Laboratory staff are qualified.	YES ☐ NO ☐ Remarks:
Total number of laboratory staff.	
Total number of administrative staff.	

(b) Adequacy of support staff

Laboratory staff adequacy is satisfactory (ideally 1 staff to 2 laboratories)	YES ☐ NO ☐ Remarks:

Administrative staff adequacy is satisfactory to support programme's operation.	YES ☐ NO ☐ Remarks:

5.3 Development of Staff

(a) Staff development

Academic staff development: The IHL has systematically plan and provide appropriate sponsorship for postgraduate studies/ sabbatical leave, training towards professional qualification. Academic staff development: The IHL has systematically plan and provide appropriate training and conferences. Academic staff development: The IHL provides appropriate assistance in paying annual professional membership fees.	YES ☐ NO ☐ Remarks:
Laboratory/Technical support staff: The programme has provided the opportunities for them to upgrade their competencies through training and practical exposure. Laboratory/Technical support staff: The programme has provided safety training.	YES ☐ NO ☐ Remarks:

(b) Staff assessment

Annual assessment of staff performance is well understood. Assessment takes into account participation in professional, academic and other relevant bodies as well as community involvement.	YES ☐ NO ☐ Remarks:

The programme established a working system for evaluation/feedback by students on matters relevant to the academic environment.	YES ☐ NO ☐ Remarks:

(c) Academic staff: student ratio

Ratio is 1:15 or better for the period of assessment.	YES ☐ NO ☐ Remarks:

Comments/Remarks/Recommendations: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

6 CRITERION 6: FACILITIES

(a) Lecture rooms – quantity provided and quality of A/V

Lecture rooms and theatres provided are in satisfactory condition equipped with learning facilities and equipment.	YES ☐ NO ☐ Remarks:
Maintenance of facilities and equipment are in proper order and properly documented.	YES ☐ NO ☐ Remarks:
Safety and health of the lecture room is satisfactory.	YES ☐ NO ☐ Remarks:

(b) Laboratory/workshop - student laboratory and equipment

Number of laboratories/workshops available.	
Laboratories/Workshops provided are in satisfactory condition equipped with adequate equipment to facilitate learning of modern engineering practice. Equipment and testing bays to accommodate FYP, mini projects and other activities are adequate and satisfactory.	YES ☐ NO ☐ Remarks:
Maintenance of facilities and equipment are in proper order and properly documented. Safety and health practice of the laboratory/ workshop is satisfactory.	YES ☐ NO ☐ Remarks:

(c) IT/computer laboratory - adequacy of software and computers

IT/computer laboratories provided are in satisfactory condition equipped with up-to-date computing and software facilities including internet access and online platforms. Engineering original software to accommodate analysis, FYP activities and simulation are adequate and satisfactory.	YES ☐ NO ☐ Remarks:
Maintenance of facilities and equipment are in proper order and properly documented. Safety and health practice of the IT/computer laboratory is satisfactory.	YES ☐ NO ☐ Remarks:

(d) Library/resource centre - quality and quantity of books, journals, and multimedia

Number of books and related materials for the programme are satisfactory. Number of electronic/digital books and references for the programme are satisfactory.	YES ☐ NO ☐ Remarks:
Learning facilities and spaces are satisfactory. Discussion rooms are available and satisfactory. Opening hours are conducive to students.	YES ☐ NO ☐ Remarks:
Maintenance of facilities and equipment are in proper order and properly documented. Safety and health practice of the library is satisfactory.	YES ☐ NO ☐ Remarks:

(e) Other facilities

The IHL provides a lively and dynamic atmosphere for the students: • The IHL provides student accommodations. • The IHL provides sport and recreational centres. • The IHL provides health centre. • The IHL provides student centre (including surau/masjid). • The IHL provides eateries/cafe.	YES ☐ NO ☐ Remarks:
Maintenance of facilities and equipment are in proper order and properly documented. Safety and health practice of the facilities are satisfactory.	YES ☐ NO ☐ Remarks:

Comments/Remarks/Recommendations: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

7 CRITERION 7: QUALITY MANAGEMENT SYSTEMS

7.1 Institutional Support, Operating Environment, and Financial Resources

(a) Sufficient to assure quality and continuity of the programme

The institutional support and financial resources are sufficient to ensure programme quality and continuity. Support from external bodies is observed.	YES ☐ NO ☐ Explain:	

(b) Sufficient to attract and retain well-qualified teaching and support staff

The institutional support and financial resources are sufficient for the programme to attract and retain well-qualified academic (take note of employing international academic staff, to comply with BEM regulation to register) and support staff.	YES ☐ NO ☐ Explain:	

(c) Sufficient to acquire, maintain, and operate facilities and equipment

The institutional support and financial resources are sufficient for the programme to acquire, maintain and operate facilities and equipment.	YES ☐ NO ☐ Explain:	

7.2 Programme Quality Management and Planning

(a) System for programme planning, curriculum development, and regular review of curriculum and content

There are established systems towards the improvement of overall programme quality. There are proper and sufficient policies/rules/regulations/procedures in the Department/Faculty or IHL and properly implemented including benchmarking and CQI.	YES ☐ NO ☐ Explain:	

7.3 External Assessment's Report and Advisory System

(a) External examiners report and how these are being used for quality improvement

EE report 1 in every 2 years. CQI initiated, if necessary, from the report.	YES ☐ NO ☐ Remarks:

(b) Advisory panel from industries and other relevant stakeholders

Industrial Advisory Panel is available. Minutes of meeting 1 in every year. CQI initiated, if necessary, from the minutes.	YES ☐ NO ☐ Remarks:

7.4 Quality Assurance

(a) System for student admission and teaching and learning

The programme has established a working system for student admission and teaching and learning to assure the achievement of the programme outcomes.	YES ☐ NO ☐ Explain:

(b) System of assessment and evaluation of examinations, projects, industrial training, etc. including preparation and moderation of examination papers

The programme has established a working system for examination regulations including preparation, moderation and assessment of examination papers, projects, industrial training and other forms of learning delivery.	YES ☐ NO ☐ Explain:

7.5 Safety, Health and Environment

(a) System for managing and implementation of safety, health and environment

There is in place a system for managing and implementation of safety, health and environment.	YES ☐ NO ☐ Explain:

Comments/Remarks/Recommendations: *Unsatisfactory/Satisfactory

Strength	
Weakness	
Concern	
Opportunity for Improvement	

EVALUATION PANEL ASSESSMENT REPORT SUMMARY

Overall Comments/Remarks:

Strength	
Weakness	
Concern	**MAJOR CONCERN** **MINOR CONCERN**
Opportunity for Improvement	
Other remarks	
Suggested Discipline	

Date of Visit:	
Programme Title:	
Faculty:	

Evaluation Panel's recommendation		Graduating Years
	Full Accreditation (6 years)	E.g. 2021, 2022, 2023, 2024, 2025 and 2026.
	Accreditation (6 years) with interim report/interim visit within 1/2/3 years	E.g. 2021, 2022, 2023, 2024, 2025 and 2026.
	Condition(s) to meet/Recommendation for further improvement	
	Accreditation (3 years)	E.g. 2021, 2022 and 2023
	Condition(s) to meet/Recommendation for further improvement	
	Decline/Defer Accreditation	
	Comments	

Prepared and submitted by Evaluation Panel:	Signature
Head:	
Member:	
Member:	
Date:	

ACTION BY ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL (ETAC)

Date Received by the ETAC: _____

Comments by the ETAC:

(i) _____

(ii) _____

(iii) _____

(iv) _____

Recommendation by ETAC

Concurs with Evaluation Panel * Yes/No

If not agreeable with Evaluation Panel's recommendation, ETAC recommendations are:

Please Mark (X)	ETAC Recommendations	Graduating Years
	Full Accreditation (6 years)	2021, 2022, 2023, 2024, 2025 and 2026.
	Accreditation (6 years) with interim report/interim visit within 1/2/3 years	2021, 2022, 2023, 2024, 2025 and 2026.
	Condition(s) to meet/Recommendation for further improvement	
	Accreditation (3 years)	2021, 2022 and 2023
	Condition(s) to meet/Recommendation for further improvement	
	Decline/Defer Accreditation	
	Reasons	
	Condition(s) to meet	

ACTION BY SECRETARIAT	
Date of Transmission of decision to BEM	
Date of Transmission of decision to MQA	
Date of Transmission of decision to JPA	
Date of Issue of Accreditation Certificate	

APPENDIX E

EXTERNAL EXAMINER'S REPORT

The external examiner's report shall contain but is not limited to the following:

(i) Assessment of the Programme Educational Objectives and Programme outcomes.

(ii) Assessment of programme curriculum in relation to:
- objectives and outcomes.
- course structure and sequence of content.
- practice-oriented components.
- teaching-learning methods and delivery modes.

(iii) Assessment of teaching and support staff quality including qualifications and industry exposure (both in institution and industry). This is to include assessment of loading of each staff in teaching and supervision of student projects.

(iv) Assessment of Teaching Staff (both in institution and industry) - student ratio and student workload. If found to be not sufficient, corrective action to be taken by the IHL.

(v) Assessment of preparation process of examination papers i.e. procedures for setting and vetting, quality assurance, confidentiality and security.

(vi) Assessment of examination papers and marking schemes set for the standard of questions, coverage of syllabus, adequate balance between theory and application, setting of questions of equal level, adequate choice of questions, and appropriateness of marking scheme.

(vii) Assessment of the marked answer scripts based on a sample of good, average and weak candidates. Fairness/disparity of marking, follow-through method adopted if answer to one section is wrong, response of candidates to the question, and distribution of marks.

(viii) Assessment of coursework, laboratory work, assignments, design projects, final year projects.

(ix) Assessment of the major facilities of the programmes.

(x) Assessment of examination procedures and regulations.

(xi) Management commitment towards the programme.

APPENDIX F

ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL

Checklist of Documents for Accreditation*/Approval of New Programme**

Please tick:

Accreditation	
Approval of New Programme	

Information Name of IHL:

Programme for Accreditation:

***For accreditation of programme only, please fill out the table below for qualifying requirements:**

A QUALIFYING REQUIREMENTS

1	Minimum 140 SLT credit units of which 100 SLT credit units must be engineering technology courses	YES/NO
2	Final year project (8 – 12 SLT credit units)	YES/NO
3	Industrial training / WBL (minimum of 24 weeks)	YES/NO
4	Minimum of 8 full-time teaching staff	YES/NO
5	Teaching Staff: student ratio of 1: 15 or better	YES/NO
6	External examiner's report	YES/NO
7	Programme Educational Objectives	YES/NO
8	Programme Outcomes	YES/NO

Failure to meet any one of the qualifying requirements will mean that the programme shall not be assessed for accreditation, and the process shall stop here and no submission to the EAC can be made by the IHL. IHLs are advised to ensure all requirements are fulfilled by the programme before re-applying for accreditation.

****For Approval of a New Programme, please fill out this Appendix wherever applicable. For new programme, a commitment to the minimum of 8 full time teaching staff and teaching staff:student ratio of 1:15 or better is expected.**

INTRODUCTION

***** Delete where applicable

A GENERAL INFORMATION

No.	Item	To be filled by the IHL where applicable	Checked by ETAC Secretariat
1	Name of IHL		
2	Address of IHL		
3	Name of Faculty/School/Department		
4	Name and phone number of Staff to be contacted		
5	Programme for Accreditation		
6	ETAC Reference Number		
7	Degree to be awarded and Abbreviation		
8	IHL awarding the degree: (if different from A1)		
9	Mode of Study [Full-Time/Twinning/Part-Time/Others (please specify)]		
10	Duration of Programme (in years)		
11	Medium of Instruction of Programme Evaluated		
12	Language Available for Reference Materials		
13	IHL Academic Session		
14	URL Address; IHL website		

B PROGRAMME ACCREDITATION HISTORY

No.	Aspect	To be filled by the IHL where applicable	Checked by ETAC Secretariat
1	Introduction Year of Programme		
2	Year of last accreditation for this programme		
3	Conditions (if any) from previous accreditation		
4	Action taken on the conditions above		
5	Major changes (self-initiated), reasons and year of changes		

C CRITERIA FOR ASSESSMENT

No.	Criterion	Indicate the sections in the SAR in which this criterion is addressed as per Section 9.0 of the Standard	Checked by Evaluation Panel
1	Programme Educational Objectives		
2	Programme Outcomes		
3	Academic Curriculum		
4	Students		
5	Teaching and Support staff		
6	Facilities		
7	Quality Management Systems		

D OTHER SUPPORTING DOCUMENTS

In the Table below, provide a list of supporting documents available in digital format as per Section 9.3 in the standard.

List of supporting documents available in digital format	Confirmation by ETAC Secretariat
	YES/NO

E INSTITUTIONAL DOCUMENTS AND ADDITIONAL DOCUMENTATION

In the table below, provide a list of institutional documents and additional documentation to be made available during the visit as per Section 9.4 in the standard.

List of institutional documents and additional documentation to be made available during the visit	Confirmation by ETAC Secretariat
	YES/NO

APPENDIX G

Appendix G – Guidelines for Evaluation Panel Samples and Format for Submission of Information

GUIDELINES FOR EVALUATION PANEL

1. INTRODUCTION

This Appendix serves as a guide to all Evaluation Panel members who are appointed by the ETAC, on their responsibilities and conduct during the accreditation exercise. It must be adhered to strictly in order to ensure consistency between one Evaluation Panel and another in terms of evaluation and final recommendation. The Guidelines have been based on the EAC Engineering Accreditation Manual 2012 (EAC, 2012).

2. PREPARATION FOR ACCREDITATION VISIT

The Evaluation Panel needs to be aware of the ETAC policies on accreditation as detailed in Section 6 of this Standard.

The Evaluation Panel members shall read the programme documentation carefully, with a view to ensuring that it provides the necessary information sought by the ETAC in the prescribed format.

The Evaluation Panel will assess the accreditation Criteria 1 to 7 criteria based on all the set forth in Section 8 of this Standard. The assessment includes the auditing and confirmation of documents submitted by the IHL. If the documents submitted are not complete, the Evaluation Panel shall request for the additional information through the ETAD.

This *Guidelines for Evaluation Panel* is a useful tool for ensuring that every important aspect of a degree programme and its delivery are assessed and reported on. However, it should be remembered that the aim of the accreditation is to determine whether a degree programme meets the academic requirements of the ETAC.

The Evaluation Panel chair and Evaluation Panel members, either together or separately, should prepare a list of questions for each section of the criteria to be certain that all aspects of the criteria have been addressed. If the IHL does not provide sufficient information, the ETAD should be notified and asked to request the additional information from the IHL. When the information is received, it should be forwarded to the Evaluation Panel chair and Evaluation Panel members. It is highly desirable for the Evaluation Panel to meet face to face and/or communicate by phone and/or e-mail (pre-accreditation visit meeting) regarding issues associated with the evaluation before the final Day (-1) meeting. Issues related to curriculum should have been cleared before the Day (-1) meeting.

3. DURING VISIT

Experience indicates that the success and credibility of an accreditation visit is shaped by:

- the professionalism and ***prior preparation*** of the Evaluation Panel and the rigour and objectivity of on-site enquiries and the report;
- the quality of feedback provided to the IHL by the Evaluation Panel; and
- timeliness of report to the ETAC.

The visit schedule should allow time for group discussion among all Evaluation Panel members for preliminary feedback and discussion of issues with the Dean and/or Head of the Faculty/School/Department/Programme.

Typical Schedule

Accreditation: Day (–1)

After 14:00	Panel Evaluator check in hotel
16:00 – 19:00	Meeting among the Evaluation Panel
19:30 – 20:30	Evaluation Panel Working Dinner (Private Session)

A day before the accreditation visit, the Evaluation Panel chair and Evaluation Panel members should hold a further meeting to finalise their findings and other issues related to the institutional programme to be evaluated. It is also important to review the questions and concerns that they have raised. At this meeting, the Evaluation Panel chair and Evaluation Panel members should discuss the ETAC evaluation criteria and how they apply to the programme being evaluated.

The discussion should include, but not be limited to the following:

- Programme educational objectives and specifications of graduate outcomes
- Whether the development, review and attainment monitoring of graduate outcomes are informed by industry stakeholders
- Whether the outcome specification drives a top-down educational design process
- Whether the academic curricular reflects a professional engineering technology programme, and whether it satisfies the criteria completely
- Whether the learning outcomes and assessment measures within courses systematically track delivery of the targeted graduate outcomes
- Whether the mathematics, chemistry and physics courses are at appropriate levels
- Whether the content of each course is appropriate
- Whether the level of course materials is appropriate
- Whether the courses are built on previous course work
- Whether the teaching-learning process includes appropriate assessment
- Whether the practice-oriented components are appropriate
- Whether the industrial training/WBL courses and project work are at a sufficient level
- Students' standing in terms of their admission standards, academic performance, and industrial training/WBL

- The teaching/WBL industry mentor and support staff in terms of their credentials and qualifications, range of competencies, advanced degrees, industrial experience, teaching loads, and their involvement and accountability as an Evaluation Panel member for educational design, review and improvement, etc.
- Whether the facilities are appropriate for the programme and operational; whether there is sufficient laboratory space for the programme, and whether safety is a theme conveyed in the laboratories, etc.
- Whether the quality management system is adequate for the programme
- Whether the external assessment is appropriate, consistent and fair
- Whether the quality loop is properly closed at both programme and individual course levels

These matters should be discussed by the Evaluation Panel to ensure that they are all in agreement with the issues to be investigated during the accreditation visit and that they are used as a basis for finalising proposed questions or themes for questioning during the various visit sessions. A proposed typical schedule for the evaluation visit is provided below. It should be noted that the objective is to be efficient with the time available, and to ensure that all of the questions and issues are addressed.

Accreditation Visit: Day 1

8:45	Evaluation Panel Meeting (Private Session)
8:45 – 9:00	Evaluation Panel briefing to the IHL Opening Remarks and Briefing by ETAC Head of Delegation on the objective of accreditation visit to IHL
9:00 – 10:00	Welcoming Remarks/Presentation by Top Management of IHL (Vice Chancellor/Rector/Dean/Head)
10:00 – 12:00	Meeting with (Dean/Head of Department /Head of Programme) to discuss OBE assessment processes, curriculum design and Quality Management System
12:00 – 14:00	Evaluation Panel Meeting (Private Session) to review displayed documents (includes a light working lunch)
14:00 – 16:00	Meeting with students
16:00 – 17:00	Meeting with external stakeholders (employers, WBL partner industry, alumni, industry advisors/programme advisors) (includes light refreshments)
17:00	Return to hotel
18:30 – 22:30	Evaluation Panel Working Dinner (Private Session)

Accreditation Visit: Day 2

8:30 – 10:00	Evaluation Panel Review of examinations, course materials and student work (includes morning tea)
10:00 – 11:30	Evaluation Panel Meeting with technical/administrative staff (additional meeting with teaching staff /WBL industry mentor and/or students may also be arranged)
11:30 – 12:30	Evaluation Panel Tour of engineering technology laboratories and associated facilities
12:30 – 15:00	Evaluation Panel Meeting (Private Session) to review displayed documents (includes a light working lunch)
15:00 – 16:30	Evaluation Panel Meeting (Private Session) to revise draft exit notes (includes light refreshment)
16:30 – 17:00	Exit meeting with IHL Senior leadership team
18:30 – 22:30	Evaluation Panel Working Dinner (Private Session to finalise evaluation panel report)

Throughout the discussions with the administrators, teaching staff, students, and support staff, the Evaluation Panel should confirm that an outcome-based approach to education is progressively being implemented by the IHL. Meetings with alumni, employers, and other stakeholders are important, as this would give an indication of their involvement in the CQI process of the programme.

4. EVALUATION PANEL REPORT GENERAL STATEMENT

It is expected that all IHLs will strive to achieve and maintain the highest standards. Thus, the quality control aspect has to be audited by the Evaluation Panel.

The Evaluation Panel is to evaluate the submitted documents and check on the relevant sections of Appendix F (Checklist of Documents for Accreditation/Approval of New Programme and Relevant Information).

The Evaluation Panel is to prepare a report as per Appendix D (Evaluation Panel Report), focusing on the attainment of the Programme Outcomes (PO). Appropriate comments and remarks shall be made based on the assessment, which includes auditing and confirmation of the documents submitted by the IHL.

The Evaluation panel report (Appendix D) shall:

a) State whether the programme meets ETAC requirements.
b) Where appropriate, provide constructive feedback (weaknesses and concerns) and note positive elements (strengths). Suggestion for opportunities for improvement should be given in the report.

c) In the event of adverse comments, provide a judgement as to the seriousness, any remedial action proposed or required, the time frame for the remedial action, and whether accreditation should be recommended, or deferred.
d) Make clear and unequivocal recommendations to ETAC.

The Evaluation Panel report should be forwarded to ETAC no later than 22 working days after the visit.

Declined accreditation, would be recommended for the programme if there are any major shortcomings and (non-compliances) for any of the criterion. Before proceeding with the thorough evaluation of the criteria, the Evaluation Panel must ensure that the following qualifying requirements have been met by the programme:

1 Minimum 140 SLT* credit units of which about 40-50% time should be allocated for practice-oriented components.
2 Final year project (8-12 SLT credit units)
3 Industrial training / WBL (minimum of 24 weeks)
4 Full-time teaching staff (minimum of 8)
5 Staff: student ratio 1: 15 or better
6 External examiner's report
7 Programme Educational Objectives
8 Programme Outcomes

If any of the requirements above are not complied with, the application for accreditation shall be rejected.

GUIDE FOR PANEL ASSESSMENT AND EVALUATION

The evaluation panel will carry out the assessment based on the expectations set forth in Section 8.1 to 8.7 for all the seven criteria.

CRITERION 1: PROGRAMME EDUCATIONAL OBJECTIVES

Performance Indicators
Statements are well defined, measurable and achievable
Statements are well published and publicised
Clear linkage between Programme Educational Objectives and Programme Outcomes
Important stakeholders provide inputs in the process
A documented and effective process, involving programme stakeholders, for the periodic review and revision

CRITERION 2: PROGRAMME OUTCOMES

Performance Indicators
Statements are well defined, measurable and achievable
Statements are well published and publicised
A documented processes for assessing and evaluating the extent to which the Programme Outcomes are being attained has been established
Results of these evaluations must be systematically utilized as input for the continuous improvement of the program
Important stakeholders provide inputs in the process

CRITERION 3 : ACADEMIC CURRICULUM

Indicators	Expected Performance
SLT Credit Units	
(a) Total number of SLT credit units	The academic programme component must consist of a normally four-year duration of full-time-equivalent study with a minimum total of 140 SLT credit units (not including units for remedial courses)
(b) Number of SLT credit units for engineering technology subjects	A minimum of 100 SLT credit units shall be engineering technology courses consisting of engineering sciences, discipline core courses, design/projects, and industrial training appropriate to the student's field of study.
(c) Number of SLT credit units for other related general education subjects	The remaining SLT credit units shall include sufficient content of general education component (such as mathematics, computing, languages, general studies, co-curriculum, management, law, accountancy, economics, social sciences, etc.)

Indicators	Expected Performance
The Curriculum	
(a) Programme Structure, Course Contents, and Balanced Curriculum	A balanced curriculum shall include all technical and non-technical attributes listed in the Programme Outcomes, and shall have the balance between the essential elements forming the core of the programme and additional specialist or optional studies (electives). The curriculum shall ensure that at least 50% of the face to face time should be allocated for practice-oriented components. The course structure and sequence of content shall be appropriate. Adequate time shall be allocated for each component of the content/course, including for elective courses. Evidence shall be present to show that the contents are being updated to keep up with the scientific, technological and knowledge development in the field, and to meet the needs of society. Electives are strongly encouraged, monitored, and appraised. The proportion of electives shall not exceed the core subjects and shall preferably offer wide options.
(b) Programme Delivery and Assessment Methods	The programme delivery and assessment methods shall be appropriate to, consistent with, and shall support the attainment or achievement of the Programme Outcomes. Alongside traditional methods, other varieties of teaching-learning (delivery) modes such as Work Based Learning (WBL), assessment and evaluation methods shall be designed, planned and incorporated within the curriculum to enable students to effectively develop the range of intellectual and practical skills, as well as positive attitudes as required in the Programme Outcomes.

Indicators	Expected Performance
The Curriculum	
	The assessment to evaluate the degree of the achievement of the Programme Outcomes by the students shall be done both at the programme as well as at course levels. The teaching-learning methods shall enable students to take full responsibility for their own learning and prepare them for life-long learning. Tutorials, group learning, interaction and innovative educational experience are designed to complement lectures. Tutorial and all other delivery approaches arepart and parcel of the programme so as to complement the lectures. A tutorial session should preferably not exceed 30 students at any one time.
(c) Practice-oriented components	Students should be able to practise engineering skills to complement engineering theory that is learnt through lectures. Practice-oriented learning experiences should engage students with the use of facilities, equipment and instrumentation reflective of current industry practice which will help in developing competence in executing applied and experimental work. Students should work in groups, preferably not more than five in a group. Throughout the programme, there should be adequate provision for laboratory or similar investigative work, which will develop in the students the confidence to deal with applied engineering problems.
(d) Final-Year Project/Design Project	The final year project, consisting of either industry-based or practice-oriented projects, can provide one of the best means of introducing a real professional approach to engineering studies and practices. For this reason, the use of projects as a vehicle for teaching and for integration of core areas is strongly encouraged throughout the programme. The final year project report shall be checked by the Evaluation Panel. The assessment shall have been done through a systematic manner. The appropriateness of the project topics in relation to the degree programme is to be monitored.

Indicators	Expected Performance
The Curriculum	
	It is proposed that at least 9 reports are to be examined by the Evaluation Panel (3 from the best group, 3 from the middle group and 3 from the poor group). The supervisors of the Projects must be teaching staff members or qualified Engineers from the industry. The place where the projects are conducted should have the facilities to support the projects. The final year project is compulsory for all students and demands individual analysis and judgement, and shall be assessed independently. The student is shown to have developed techniques in literature review and information prospecting. It provides opportunities to utilise appropriate modern technology in some aspect of the work, emphasising the need for engineers to make use of computers and multimedia technology in everyday practice.
(e) Industrial Training	Training in engineering practice will provide first-hand experience in an engineering-practice environment, outside the IHL. Familiarity with all common engineering technology processes is essential and training at a practical level to a wide variety of processes is required at a level appropriate to the students. Whilst it is clearly desirable for students to be properly trained for the skills involved, the central aim is to acquire craft skills. Clearly, many of the latest processes and large scale or costly operations can only be the subject of observation or demonstration, and visits to engineering works may be helpful in many such cases. Industrial training is a key component of learning in an integrated academic curriculum. Due to its importance, the programme shall have a minimum of 24 weeks and a maximum of 1 year industrial training for each student. IHL shall put a strenuous effort to assist all students to gain placements of suitable quality.

Indicators	Expected Performance
The Curriculum	
(f) Work-Based Learning	Work-Based Learning (WBL) is one of the educational approaches that provides students with authentic context for learning and real-life work experiences in an engineering industry environment. IHL shall work with WBL partner industry to ensure the relevance of learners' training during periods of WBL. The Evaluation Panel is to assess the WBL courses which integrate the IHL curriculum with the workplace to create a diversity of learning environment through merging theory with practice in workplace. The IHL and partner industry should agree when the quality of the WBL training will be monitored and how improvement will be made. IHL and WBL partner industry must continuously aware of the specific needs of learners throughout their WBL training. The IHL must ensure students' and partner industry are kept well informed and receive updates on all aspects of WBL training. The IHL must ensure the industry-based staff are well prepared for their WBL training role. The IHL must work with partner industry to review the WBL training programme and to assess and certify individual students' achievements, where appropriate.
(g) Training in Engineering Practice	Training in engineering practice shall also be integrated throughout the curriculum as it is a key. In addition, exposure to professional engineering practice may also be obtained through activities as listed on page 14 of the Standard.

CRITERION 4: STUDENT

Indicators	Expected Performance
Student Admission	
(a) Entry requirements (Academic)	The entry requirement to the programme shall be evaluated to ensure that the students accepted have the minimum qualifications required for training and education as an engineering technologist.
(b) Transfer Policy/Selection Procedures/Appropriate ness of arrangements for Exemptions from part of the course	IHLs must put in place the mechanism for credit transfer and exemption to allow alternative educational pathways. A maximum of 50% of the total credit units is allowed for lateral credit transfer from a similar level programme. A maximum 30% of total credit units is allowed for vertical credit transfer from diploma level to degree level. If the IHL, or IHLs in formal collaboration, have designed both programme curricula together to ensure continuity, coherence and completeness, the maximum transfer allowed is 50%. A programme shall have clear policies on credit transfer. Credit transfer as described above may include APEL C components as prescribed by MQA based on appropriate justifications by the IHL.
Student Development	
(a) Student Counselling	IHLs shall monitor and evaluate student performance, advice and counsel students regarding academic and career matters, as well as provide assistance in handling health, financial, stress, emotional and spiritual problems.
(b) Workload	Students shall not be over-burdened with workload that may be beyond their ability to cope with. An optimum credit units per semester shall be between 16-20 SLT credit units.
(c) Enthusiasm and Motivation	The teaching-learning environment shall be conducive to ensure that students are always enthusiastic and motivated.
(d) Co-curricular activities	IHLs shall also actively encourage student participation in co-curricular activities and student organisations that provide experience in management and governance, representation in education and related matters and social activities.

Indicators	Expected Performance
Student Development	
(e) Observed attainment of Programme Outcomes by students	The Evaluation Panel is to get a first-hand feel of the students' achievement of the Programme Outcomes by interviewing and observing them at random as well as going through random samples of student's work.

CRITERION 5: TEACHING AND SUPPORT STAFF

Indicators	Expected Performance
Teaching Staff	
(a) Number and Competency of Teaching staff	It must be demonstrated that the teaching staff have the competencies to cover all areas of the programme, and are fully aware of the outcome-based approach to education. In addition, teaching staff shall be sufficient in number and capability to accommodate student-staff interaction, advising and counselling, service activities, professional development, and interaction with practitioners and employers. This is to ensure the quality of the engineering technology programme and the attainment of its stated outcomes. As a guide, a viable engineering technology department would be expected to have a minimum of 8 full-time teaching staff in the particular engineering discipline.
(b) Qualification, industrial experience & development	Teaching staff shall have postgraduate degrees (Masters level or higher). However, a staff member with good first degree and 5-year industrial/specialist experience with acceptable professional qualifications may be considered. 30% of the lecturers/instructors must have a professional/industrial/specialist certification or at least TWO (2) years of relevant industrial work experience. If this is not met, the institution should have a staff industrial attachment scheme in place. For industry mentors, they should have at least five (5) years in relevant related industry.

Indicators	Expected Performance
Teaching Staff	
(c) Research/publication/consultancy	Teaching staff members should be given opportunities to conduct research. The IHL should have provision for research grants for the staff members. Research Output includes recent publication in conferences/refereed journals and patents.
(d) Industrial involvement	The Evaluation Panel is to assess whether the staff members are involved in appropriate consultancy and industrial jobs.
(e) Teaching load/contact hours	Average teaching load (teaching hours per week): < 12 hours (good), 12 – 15 (satisfactory), >15 (Unsatisfactory).
(f) Motivation and enthusiasm	The Evaluation Panel is to have a separate meeting with faculty staff members to assess their motivation and enthusiasm.
(g) Use of lecturers from industry/public bodies	The Faculty/Department is encouraged to invite engineers from industry and professional bodies to deliver seminars/lectures/talks to students. However, this is not meant as a replacement of full-time staff members for teaching purposes.
(h) Awareness of the Outcome-Based approach to education	The Evaluation Panel is to assess staff awareness of the Outcome-Based approach to education.
Support Staff (Laboratory and Administration)	
(a) Qualification and experience	Certificates, diplomas and degrees in the relevant areas: >80% of staff (Good) 60-80 (Satisfactory) < 60 (Unsatisfactory)

Indicators	Expected Performance
Support Staff (Laboratory and Administration)	
b) Adequacy of support staff	There shall also be sufficient, qualified and experienced technical and administrative staff to provide adequate support to the educational programme. It is recommended that each technical staff shall be in charge of not more than two laboratories. 1 Laboratory Staff Member to 1 Laboratory: Good 1 Laboratory Staff Member to 2 Laboratories: ~~60-80%~~ Satisfactory 1 Laboratory Staff Member to more than 2 Laboratories: Unsatisfactory
Development of Staff	
(a) Staff development	The IHL shall systematically plan and provide appropriate training, sponsorship for postgraduate studies/ sponsorship for conferences, sabbatical leave etc. for teaching staff. Similarly for support staff, the IHL shall provide the opportunities for them to upgrade their competencies through training and practical exposure.
(b) Staff assessment	The IHL shall incorporate annual assessment of staff performance which takes into account participation in professional, academic and other relevant bodies as well as community involvement. Similarly the IHL shall also establish a working system for evaluation/feedback by students on matters relevant to their academic environment.
(c) Teaching staff: student ratio	The Evaluation Panel shall evaluate the ratio of teaching staff: student for the programme for the last four academic sessions. The following guide shall be used for evaluation. Poorer than 1:15 - Unsatisfactory 1:12 – 1: 5 - Satisfactory Better than 1: 12 - Good

CRITERION 6: FACILITIES

<table>
<tr><th>Indicators</th><th>Expected Performance</th></tr>
<tr><td>(a) Lecture rooms - quantity provided and quality of A/V</td><td rowspan="3">There must be adequate teaching and learning facilities such as classrooms, learning support facilities, study areas, information resources (library), computing and information-technology systems, laboratories and workshops, and associate equipment to cater for multi-delivery modes.

Since engineering technology programme requires substantial practice-oriented learning, sufficient and appropriate experimental and practical facilities must be available for students to gain substantial experience in practice-oriented learning as well as in understanding and operating engineering equipment and of designing and conducting experiments. The equipment must be reasonably representative of modern engineering practice. Where practice-oriented learning is undertaken at another institution, or in industry, arrangements must be such as to provide reasonable accessibility and opportunity for learning. IHLs must ensure that all facilities are maintained and adhered to best practices in safety, health and environment where appropriate.</td></tr>
<tr><td>(b) Laboratory/workshop - student laboratory and equipment</td></tr>
<tr><td>(c) IT/computer laboratory - adequacy of software and computers</td></tr>
<tr><td>(d) Library/resource centre - quality and quantity of books, journals, and multimedia</td><td>The IHL is to have sufficient titles of text and reference books, standards and journals to support teaching and research for the programme evaluated.
For off-campus/distance-learning mode, the Evaluation Panel should comment on how the learning materials are made available and accessible to the students.</td></tr>
<tr><td>(e) Other supporting facilities</td><td>Support facilities such as hostels, sport and recreational centres, health centres, student centres, and transport must be adequate to facilitate students' life on campus and to enhance character building.</td></tr>
</table>

CRITERION 7: QUALITY MANAGEMENT SYSTEM

Indicators	Expected Performance
Institutional Support, Operating Environment, and Financial Resources	
(a) Sufficient to assure quality and continuity of the programme	The Evaluation Panel should examine the evidence provided by the Faculty/IHL on whether institutional support and financial resources are sufficient to ensure programme quality and continuity. Support from external bodies should be encouraged.
(b) Sufficient to attract and retain well-qualified academic and support staff	The Evaluation Panel should examine the evidence provided by the Faculty/IHL on whether the institutional support and financial resources are sufficient for the programme to attract and retain well-qualified academic and support staff. Support from external bodies should be encouraged.
(c) Sufficient to acquire, maintain, and operate facilities and equipment	The Evaluation Panel should examine the evidence provided by the Faculty/IHL on whether the institutional support and financial resources are sufficient for the programme to acquire, maintain and operate facilities and equipment. Support from external bodies should be encouraged.
Programme Quality Management and Planning	
(a) System for programme planning, curriculum development, and regular review of curriculum and content	The Evaluation Panel should concentrate on auditing the implementation of the quality control system. Generally the Evaluation Panel will assess whether there are proper and sufficient policies/rules/regulations/ procedures in the Department/ Faculty or IHL, and whether those systems are implemented. Quality systems such as ISO9000 should be encouraged. Other forms of implementation for quality purposes such as external examiners, board of studies, and benchmarking shall also be evaluated. The established system for the programme shall be evaluated to see the effectiveness of such a system towards improvement of overall programme quality.

Indicators	Expected Performance
External Assessment's Report and Advisory System	
(a) External examiners report and how these are being used for quality improvement	The programme shall appoint an external examiner to assess the overall quality of the programme. The Evaluation Panel shall examine the external examiner's reports and determine whether the recommendations by the examiners have been implemented by the programme to improve overall quality. Assessment is to be made at least twice during the 6-year accreditation cycle, preferably once during the initial period of the accreditation cycle and another before the next accreditation visit.
(b) Advisory panel from industries and other relevant stakeholders	The IHL shall have an industry advisory system for participation by practicing engineers or engineering technologists, and employers of engineer technologists for the purpose of planning and continuous improvement of programme quality. These industry advisors shall be expected to provide inputs and recommendation on an on-going basis through participation in discussion and forums.
Quality Assurance	
(a) System for student admission and teaching and learning	The IHL shall establish a working system for student admission as well as teaching and learning.
(b) System of assessment and evaluation of examinations, projects, industrial training, etc. including preparation and moderation of examination papers	The IHL shall establish a working system for examination regulations including preparation and moderation of examination papers. The IHL shall establish a working system for assessment of examinations, projects, industrial training and other forms of learning delivery. The scope of assessment shall be wide enough to cover the achievement of programme outcomes.

FORMAT FOR SUBMISSION OF INFORMATION

TABLE 1 Course to PO Matrix (SAMPLE)

Code:	Course:	Link to the PO											
		1	2	3	4	5	6	7	8	9	10	11	12
ENGXXA	Course 1	X			X						X		
ENGXXB	Course 2		X	X	X								
ENGXXC	Course 3	X			X	X	X						
ENGXXD	Course 4	X		X							X	X	X
ENGXXE													
ENGXXF													
ENGXXG													
ENGXXH													
ENGXXI													
ENGXXJ													
ENGXXK													
ENGXXL													

NOTE: Programmes can adopt other approaches and not necessarily adhere to the above table

TABLE 2 Distributions of General Education Courses for an Engineering Technology Programme (SAMPLE)

Areas	Code	Course	Course Type	Hours			ETAC Equivalent Total
				Lecture	Lab/Workshop/ Project	Tutorial	
Applied Science/Maths/ Computer	ENG11A	Course1	Common	28	0	28	3
	ENG11B	Course2	ommon	28	0	28	3
	ENG21A	Course3	Common	28	0	28	3
	ENG21B	Course4	Core	28	0	28	3
	ENG23A	Course5	Core	28	56	0	4
	TOTAL CREDITS HOURS						**16**
Management/Law/ Accountancy	ENG241A	CourseA	Core	28	0	28	3
	ENG341B	CourseB	Core	28	0	28	3
	ENG441C	CourseC	Core	28	0	28	3
	ENG461X	CourseD	Elective	28	0	28	3
	TOTAL CREDIT HOURS						**12**
Communication Skills/Humanities/Ethics	MPW211Y	CourseX	MQA	42	0	0	3
	MPW213Z	CourseY	MQA	42	0	0	3
	MPW214X	CourseZ	MQA	42	0	0	3
	TOTAL CREDIT HOURS						**18**
TOTAL CREDIT HOURS FOR GENERAL EDUCATION COURSES							**43**

TABLE 3: Courses Offered (Programme Structure) According to Semester and Total Credit Hours (SAMPLE)

Semester	Course Code	Course	Course Type	Credit
1	GED11A	Course A	Common	3
	GED11B	Course B	Common	3
	MPU111H	Course H	Compulsory	3
	BEE101	Course 1	Core	3
	BEE102	Course 2	Core	4
	BEE103	Course 3	Core	3
2	GED21C	Course C	Core	3
	BEE201	Course 4	Core	3
	BET201	Course 6	Core	3
	BET202	Course 7	Core	3
	BET203	Course 8	Core	3
	BEE202	Course 9	Core	4
3	MPU314K	Course K	Compulsory	3
	BEE302	Course 10	Core	3
	BET303	Course 11	Core	3
	BEE304	Course 12	Core	4
	BET305	Course 13	Core	2
	GED311M	Course M	Core	2
4	BEE401	Course 14	Core	3
	BEE402	Course 15	Core	3
	GED441G	Course G	Elective	3
	BEE403	Course 16	Core	3
	BET404	Course 17	Core	4
5	DEE501	Course 18	Core	3
	MPU511L	Course L	Compulsory	3
	DEE502	Course 19	Core	3
	DEE503	Course 20	Core	3
	GEE512	Course H	Elective	4
6	DUT601	Course 21	Core	3
	GED602	Course 22	Core	3
	BEE603	Course 23	Core	3
	BEE604	Course 24	Elective	4
	BEE605	Course 25	Core	3
	BEE606	Final Year Project 1	Core	6
7	BET701	Course 26	Core	6
	BET702	Course 27	Core	3
	BET703	Course 28	Core	3
	GET714	Course 29	Elective	3
	BEE712	Final Year Project 2	Core	4
8	BUT801	Industrial Training	24 weeks	12
TOTAL CREDIT HOURS				**140**

TABLE 4 Distribution of Student Enrolment for all Academic Years for the Past Four Years

YEAR	Year			
	201a	201b	201c	201d
1st Year				
2nd Year				
3rd Year				
4th Year				
Total No. of Students Per Year				

TABLE 5 Entry Qualifications of Final Year Students of the Current Year

Entry	Number
STPM	
Matriculation	
Diploma	
Others (credit transfer, etc.)	

TABLE 6 Breakdown in Terms of Numbers of Teaching staff (Fulltime, Part-Time and Interprogramme) by Year for all Academic Years for the Past Four Years

TEACHING STAFF	SESSION			
	201a	201b	201c	201d
(a) Total number of full-time staff (including those servicing other programme, staff on study or sabbatical leave & tutors)				
(b) Full-time equivalent of teaching staff servicing other programme				
(c) Teaching staff (on study or sabbatical leave)				
(d) Tutors				
(e) Effective full-time teaching staff = (a)-(b)-(c)-(d)				
(f) Full-time equivalent of teaching staff from other programme servicing this programme				
(g) Full-time equivalent of part time teaching staff/ industry mentor				
Full-Time Equivalent Teaching staff (FTES) Contributing to Staff: Student Ratio = (e)+(f)+(g)				

Notes :

If an teaching staff member is involved in teaching more than one degree programme (including off-campus and distance learning), then the full-time equivalent of that particular staff has to be calculated.

For full time equivalent staff calculation, the following can be used as a basis:

One Full-Time Equivalent Staff Member should normally have 15 contact hours (lecture/tutorial/lab
supervision/student consultation) per week.

Table 7 Analysis of all Teaching staff

No	Name	Post Held	Date of First Appointment at the Fac / Sch / Dept.	Part or Full Time or from other Programme	Academic Qualifications/ Field of Specialisation/ Institution and Year of Award	Professional Qualification	Membership in Professional Bodies	Years of Experience		Level of activity (High, medium, low, none)		
								Govt./ Industry Practice	This Fac / Sch / Dept.	Professional Society (Indicate Society)	Research	Consulting / Work in Industry
1												
2												
3												
4												

TABLE 8 Academic Qualifications of Teaching staff

Academic Qualifications	Number
Doctorate	
Masters	
Bachelor	
TOTAL	

TABLE 9 Professional/Industrial/Specialist Certifications and Membership

Type of Qualification/Field	Number
Peng	
CEng	
CPEng	
FIEM	
MIEM	
Graduate Engineer IEM	
Graduate Engineer BEM	
IEAust	
Etc.	

TABLE 10 Post Held by Teaching Staff

Post	Number	
	Full Time	Part Time
Professor		
Assoc. Professor		
Sr. Lecturer		
Lecturer		
Tutors		
TOTAL		

TABLE 11 Teaching staff Teaching Workload Summary for the Current Semester

Staff Member (Name)	Part or Full Time or From Other Programme	Courses Taught (Course Code/Credit Hrs.)

TABLE 12 Analysis of all Support Staff

Name	Post Held	Date of First Appointment at the Fac/Sch/Dept	Academic Qualifications/Field of Specialization/ Institution and Year of Award	Years of Experience	
				Govt/Industry Practice	This Fac/Sch/Dept

TABLE 13 Post Held by Support Staff

Post	Number
TOTAL	

Table 14 Staff: Student Ratio

SESSION	201a/201b	201b/201c	201c/201d	201d/201e	AVERAGE
RATIO					