



**Engineering Accreditation Council**



**Board of Engineers Malaysia**

# ENGINEERING PROGRAMME ACCREDITATION MANUAL

**2017**

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**DEFINITIONS****Acronyms**

BEM	- Board of Engineers Malaysia
CQI	- Continual Quality Improvement
EAC	- Engineering Accreditation Council
EAD	- Engineering Accreditation Department
IEM	- The Institution of Engineers, Malaysia
IHL	- Institutions 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
OBE	- Outcome-Based Education
SPM	- Sijil Pelajaran Malaysia (Malaysia Certificate of Education)

### General

- Head of Delegation - An Associate Director of EAD/Senior Evaluator/any suitable representative appointed by EAC to advise the Evaluation Panel during an accreditation visit.
- Evaluation Panel - A panel of evaluators appointed by EAC to evaluate an engineering programme for compliance with accreditation criteria.
- Evaluator - A person appointed by EAC to evaluate Application for Approval to Conduct a New Degree Programme or evaluate a programme for accreditation or to evaluate a continuing/interim accreditation.
- Accreditation Appeals Board - A Board to consider appeals from an Institution of Higher Learning on any EAC decision.
- Graduate Engineer - A person registered under Section 10(1a), Registration of Engineers 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/School/ Department	- The entity which is responsible for designing and conducting the programme to be accredited.
Programme	- The sequence of structured educational experience undertaken by students leading to completion, on satisfactory assessment of performance.
Degree	- Bachelor of engineering programme leading to engineering qualification in Malaysia.
Course	- Subject offered in the programme.
Stakeholders	- Parties having an interest (direct and indirect) in the programme output, for example, employers, Industry Advisory Panel (IAP), External Examiners, sponsors, lecturers and students, etc.
Academic staff	- Staff responsible for teaching and learning activities in the programme leading to the award of an engineering 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 programme implementation.
External Examiner	- A person with high academic standing in relevant field appointed by the IHL to assess overall academic programme and quality.



- Industry Advisory Panel
- A body consisting of relevant professionals from industries, government sector, professional organisations, regulatory bodies, alumni etc., appointed by the IHL to ensure programme relevancy to stakeholders' needs.

### Accreditation

Approval	- Permission from the relevant authorities to conduct a new programme.
Accredited Programme	- An engineering programme whose graduates are acceptable for graduate registration with the BEM. This is accorded to a programme that satisfies the minimum standard for accreditation set by EAC.
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.
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 EAC.
Declined Accreditation	- This is the status of a programme that fails to meet the minimum standard for accreditation. In such a case, a further application is not normally considered within the next one year.
Cessation/ Termination of Accreditation	- EAC 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 recommended for approval to be conducted by EAC.

## 1.0 Introduction

The Board of Engineers Malaysia (BEM) registers graduates and professional engineers under the Registration of Engineers Act 1967 (Revised 2015). The pre-requisite for registration as a graduate engineer is a qualification in engineering recognised by the BEM.

BEM has a duty to ensure that the quality of engineering education/programme of its registered engineers attains the minimum standard comparable to global practice. Hence the necessity to accredit engineering programmes conducted in IHLs.

Engineering Accreditation Council (EAC) is the body delegated by BEM for accreditation of engineering degrees. The EAC is made of representatives of the BEM, The Institution of Engineers, Malaysia (IEM), Malaysian Qualification Agency (MQA) and the Public Services Department (Jabatan Perkhidmatan Awam Malaysia (JPA)). The Terms of Reference of the EAC are outlined in Appendix A (Engineering Accreditation Council, Evaluation Panel and Accreditation Appeals Board).

This Manual outlines details for accreditation of an engineering 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 programmes or newly proposed programmes.

This Manual includes elements of outcomes in the engineering 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 programmes meet the minimum academic requirements for registration as a graduate engineer with the BEM.

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

### **3.0 Engineering**

The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behaviour under specific operating conditions; all as respects an intended function, economics of operation or safety to life and property.

### **4.0 Accreditation Policy**

This section outlines the EAC's accreditation policy underlying the accreditation process. Accreditation shall be considered upon a written request from the IHL.

#### **4.1 The Accreditation Process**

Accreditation of engineering programmes is undertaken by the EAC at the request of the IHL.

The EAC's accreditation process will focus on outcomes and the internal systems developed by the IHL to 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 practise engineering.

#### **4.2 The Accreditation Cycle**

Accreditation is accorded to a programme for a maximum period of six (6) years per cycle. The period that IHL shall apply for accreditation is mentioned in Section 5.1.

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

#### **4.3 Programmes**

An IHL may offer programme/s via various pathways at the main campus or at different locations, such as full-time, franchised, twinning, part-time, distance learning, joint degree, multi campus etc. It is advisable that the various pathways are disclosed in the award of the degrees, either on the degree certificate or academic transcripts. For each of the pathways, the IHL shall apply for accreditation separately.

If the different pathways for programmes from the same IHL that bear the same name are not disclosed on the degree certificate or academic transcripts, a single

accreditation decision applies to all pathways, i.e. the accreditation decision of one pathway will affect the other pathways, and the weakest governs.

A programme shall be evaluated based on the criteria stipulated in Section 6 of this Manual.

#### **4.4 Application and Preparation for Accreditation Visit**

The IHL shall make an application for programme accreditation as per the requirements of Section 7 of the Manual to the EAC and MQA. Appendix F shows the process flow chart on Application for Accreditation and Approval of Engineering Programmes.

The accreditation visit shall be deferred if the submitted documents are of unacceptable quality, or do not follow the required format of Section 7 of the Manual. In such a case, the IHL shall re-submit the application.

If the documents submitted followed the required format, but the contents are found to be inadequate, the IHL shall be required to provide further information, or clarification. If the IHL does not provide further information in good time for the visit, the EAC may cancel the visit.

#### **4.5 Accreditation Evaluation**

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

The evaluation exercise shall be conducted by an Evaluation Panel (consisting of three (3) members) for new programme and new-cycle accreditation; or an Evaluator (consisting of only 1 member) for interim or continuing accreditation appointed by EAC (refer to Appendix A).

#### 4.6 Accreditation Decision

Upon completion of the new or new-cycle programme accreditation exercise, the EAC, based on the recommendation of the Evaluation Panel, may decide one of the following conditions for the graduating cohorts:

- (i) To accord full accreditation for six (6) years.
- (ii) To accord accreditation for less than six (6) years.
- (iii) To defer accreditation. This is to allow the IHL to fulfil condition(s) that may be imposed by the EAC. In such a case, a re-submission shall be made within a year.
- (iv) To decline accreditation. In such a case, a further application is not normally considered within the next one year.

Programme accredited without any concerns is accorded a full six-year accreditation without any condition. Programme with any weakness shall be deferred or declined accreditation. Programme accredited with concerns is accorded accreditation for six (6) years or less **with conditions**, subject to the decision of the EAC.

The IHL shall take appropriate actions to remedy the concern(s), and submit evidence of such corrective action(s). A further visit will be scheduled to verify the results of the remedial action(s), in an interim or continuing accreditation visit, if deemed necessary. If adjudged satisfactory, based on the recommendation of the Evaluator, the interim condition may be lifted for programmes with interim condition and the earlier accreditation award is upheld, or the remaining period of the accreditation may be accorded by the EAC for continuing accreditation.

Failure to address the concern(s) may result in cessation of accreditation at the end of the stated period.

The EAC's decision shall be sent to MQA, with copies to IHL. The accreditation shall be accorded to a specific programme pathway (location and mode).

#### 4.7 Revisions to an Accredited Programme

The IHL shall update the EAC and MQA of major changes (such as, 30% or more of the curriculum, location, pathways, programme name or programme duration) that may impact an accredited programme. Failure to do so may cause the EAC to reconsider the accreditation decision awarded earlier. The EAC may then direct the IHL to apply for re-accreditation of the revised programme.

#### 4.8 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 7 of this Manual to the EAC and MQA for programme evaluation. The recommendation from EAC shall be forwarded to the relevant authorities. The evaluation exercise shall be conducted by an Evaluator appointed by EAC (refer to Appendix A).

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 three (3) months, it shall be deemed that the IHL no longer intends to conduct the programme.

#### **4.9 Publication of Accreditation Status**

EAC shall regularly update the list of accredited programmes on the website.

#### **4.10 Appeal Procedures**

The EAC decision is final. However, an IHL may appeal against a decision made by the EAC. The notice of appeal must be made in writing to the Accreditation Appeals Board within two (2) weeks upon receiving the decision, stating the basis of the appeal. Appeal documents are to be submitted within four (4) weeks after the above notice of appeal.

The Appeals Board shall consist of the President of BEM, President of IEM and CEO of MQA or their nominated representatives. The President of BEM or the nominated representative shall be the Chairman of the Appeals Board.

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 within three (3) months from the receipt of the complete documents. The decision of the Appeals Board shall be final.

#### **4.11 Confidentiality**

Documents or other information obtained by the Evaluation Panels, Evaluators, Associate Directors, EAD staff, and EAC members in connection with the accreditation exercise shall be treated as confidential.

#### 4.12 Expenses

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

#### 4.13 Conflict of Interest

Members of the EAC, EAD Associate Directors, Evaluation Panels, Evaluators, Appeals Board and EAD 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.

### 5.0 Accreditation Procedure

This section describes EAC's accreditation procedures from the process of application to the notification of accreditation results.

#### 5.1 Application for Accreditation

The following gives the various types of programmes accreditation, and the deadlines for applications:

- a) New programme (first-cycle) accreditation: at least six (6) months before the final examination of the first intake of students.
- b) New-cycle accreditation of accredited programme: at least six (6) months before the expiry date of the accreditation.
- c) Interim or continuing accreditation: at least six (6) months before the expiry date of the accreditation or interim period.
- d) Deferred accreditation: latest one (1) year after deferment decision.
- e) Declined accreditation. Not less than one (1) year after declined decision.

The EAD upon receiving the application by the IHL will decide on the dates of the accreditation visit. Once the visit dates have been fixed, the programme is given three (3) months deadline prior to the visit to submit the necessary accreditation documentations as specified in Section 7 of this Manual.

The application will be deemed to have been withdrawn, if the documents are not submitted latest three (3) months before the set dates for the visit.

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

Failing to abide with the deadlines may result in delay or rejection of graduates' registration with BEM.



## 5.2 Appointment of Evaluation Panel and Evaluator

On submission of all required documents, an Evaluation Panel or Evaluator shall be appointed as per Appendix A of this Manual. Members of the Evaluation Panel or an Evaluator are/is selected base on their expertise and standing in the particular discipline. The Evaluation Panel appointed shall consist of representatives from both industry and academia so as to provide balanced perspective and experience to the assessment of a programme.

The Evaluation Panel or Evaluator needs to be aware of EAC policies and accreditation criteria as outlined in this Manual. The Evaluation Panel or Evaluator will assess the programme based on the accreditation criteria set forth in this Manual. The assessment includes the auditing and confirmation of documents submitted by the IHL.

The Guidelines for Evaluation Panel and Evaluator in Appendix H are useful tools for ensuring that every important aspect of a degree programme and its delivery are assessed and reported on.

## 5.3 Scheduling of a Visit

A visit is arranged and coordinated by the EAD on an appropriate date suitable to both the Evaluation Panel/Evaluator and the IHL. The visit should be held latest three (3) months after the receipt of the IHL documents by the Evaluation Panel/Evaluator. It is important that as far as possible, the agreed dates of visit are adhered to.

## 5.4 Pre-Accreditation Visit Meetings

The Evaluation Panel for a programme should meet at least **once** (either virtual or physical) upon receiving the accreditation documents, and again on the evening of Day –1 before the actual accreditation visit in order to study and discuss documents, and systematically identify and agree on the shortcomings prior to the visit. The Evaluation Panel/Evaluator should strategically plan and/or put in request supplementary input or Request for Information (RFI) or Request for Clarification (RFC) from the IHL to fill the gaps before the visit. This request for further information required should be communicated to the IHL through the EAD.

## 5.5 Accreditation Visit

The accreditation visit will normally be scheduled for a period of two (2) days for new programme/new-cycle/revisit(in deferment case), or one (1) day for continuing/interim visit. The overall conduct of the visit shall be managed by the EAD. A typical schedule of the visit is given in item 3 of Guidelines for Evaluation Panel and

Evaluator (Appendix H) of this Manual. The visit shall normally include but not limited to the following:

- (a) Opening meeting with the IHL Management.
- (b) Meeting with staff members.
- (c) Meeting with students.
- (d) Meeting with external stakeholders such as alumni, employers, and industry advisors.
- (e) Visiting and checking of facilities.
- (f) Checking relevant documents.
- (g) Exit meeting with IHL Management.

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

## 5.6 Report and Recommendation

The report, prepared in accordance to Appendix D (for new programme and new cycle accreditation) or the standard format (for continuing or interim accreditation), by the Evaluation Panel/Evaluator shall be submitted to the EAD within four (4) weeks after the visit.

## 6.0 Qualifying Requirements and Accreditation Criteria

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

<b>Criterion 1</b>	-	<b>Programme Educational Objectives (PEOs)</b>
<b>Criterion 2</b>	-	<b>Programme Outcomes (POs)</b>
<b>Criterion 3</b>	-	<b>Academic Curriculum</b>
<b>Criterion 4</b>	-	<b>Students</b>
<b>Criterion 5</b>	-	<b>Academic and Support Staff</b>
<b>Criterion 6</b>	-	<b>Facilities</b>
<b>Criterion 7</b>	-	<b>Quality Management Systems</b>

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 disqualify the programme from further assessment.**

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

1. Outcome-based Education (OBE) implementation.
2. A minimum of 135 SLT credits\* of which 90 SLT credits\* must be engineering courses offered over a period of four (4) years.
3. Integrated design project (IDP).
4. Final year project (minimum six (6) credits).
5. Industrial training (minimum of eight (8) weeks).
6. Full-time academic staff (minimum of eight (8)) with at least three (3) Professional Engineers registered with the BEM or equivalent.
7. Staff: student ratio 1: 20 or better.
8. External examiner's report.

\* 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.

**Note:** Please refer to Guidelines for Evaluation Panel (Appendix H) for further elaboration of the expectation with regards to this section.

### 6.1 Criterion 1: Programme Educational Objectives

Programme Educational Objectives (PEOs) are specific statements/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 (3 to 5) years after graduation. The PEOs must be considered in the design and review of the curriculum in a top down approach.

The programme shall publish and appropriately review the PEOs at the determined time, and ensure the PEOs are linked to the POs and considered for the curriculum delivery.

## 6.2 Criterion 2: Programme Outcomes

Programme Outcomes 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 programme are expected to attain the following POs:

- (i) **Engineering Knowledge** - Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation as specified in WK1 to WK4 respectively to the solution of complex engineering problems;
- (ii) **Problem Analysis** - Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4);
- (iii) **Design/Development of Solutions** - Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (WK5);
- (iv) **Investigation** – Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
- (v) **Modern Tool Usage** - Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6);
- (vi) **The Engineer and Society** - Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7);
- (vii) **Environment and Sustainability** - Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts. (WK7);
- (viii) **Ethics** - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7);
- (ix) **Individual and Team Work** - Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;
- (x) **Communication** - Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
- (xi) **Project Management and Finance** - Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments;

- (xii) **Life Long Learning** - Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The range of **complex problem solving** and **complex engineering activities** are given in Appendix B – Section (d) Definition of Complex Problem Solving; Section (e) Definition of Complex Engineering Activities; and Section (f) lists the Knowledge Profile (WK).

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

- (i) **Programme Outcomes (POs)**: The IHL/faculty shall have published POs that have been formulated considering items (i) to (xii) given above, and any added outcome that can contribute to the achievement of its stated PEOs.
- (ii) **Processes and Results**: All POs shall be considered in designing the curriculum. The attainments of the POs must be adequately assessed, and use for improvements including course and programme levels.
- (iii) **Stakeholders' Involvement**: The IHL/faculty shall provide evidence of stakeholders' involvement with regard to (i) and (ii) above.

**Note:** Please refer to Evaluation Guidelines (Appendix H) for further elaboration of the expectation with regards to this section.

### 6.3 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 POs.

A balanced curriculum shall include all technical and non-technical attributes listed in the POs, and there shall be a balance between the essential elements forming the core of the programme and additional specialist or optional studies (electives). The curriculum shall integrate theory with practice through adequate exposure to laboratory work and professional engineering practice.

Guidelines on academic programmes outlined in this Manual provide essential elements and features, which when combined will render a programme acceptable for accreditation by the EAC.

All engineering programmes need to cover the broad areas of their respective disciplines. Appendix B of this Manual provides list of most courses that underpin the

broad areas of the respective traditional programmes. Appropriate breadth and depth of the content shall be ensured for all courses. The course structure and sequence of content shall be appropriate. Adequate time shall be allocated for each component of the content/course. Evidence shall be presented to show that the contents are being updated to keep up with scientific, technological and knowledge developments in the field, and to meet societal needs. 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 intellectual and practical skills, as well as positive attitudes that are constructively aligned with the PEOs and POs. The assessment to evaluate the degree of the achievement of the POs of the programme shall be done and its level of attainment recorded. The assessment of POs and the Course Outcomes (COs) by the students may also be done both at the programme as well as at course levels, respectively. The teaching-learning methods shall enable students to take full responsibility for their own learning and prepare them for life-long learning. The programme shall demonstrate the relationship between the courses and the POs.

IHLs need to consult the industry in keeping the PEOs, POs, and content up-to-date. However, they should not lose sight of the need to provide an education in engineering, which will form a sound basis for a career that is likely to see rapid changes in technology. As a general rule, it will be appropriate for the programme structure to be designed to give a progressive shift of emphasis from engineering science and principles in the early stages towards more integrated studies in the final year, in a way that will impart knowledge of application of fundamentals and provide a focus for a professional approach.

The emphasis on particular elements or features of the programme must remain flexible, but it will be required in the accreditation process to confirm that minimum levels of understanding and standards of achievement are attained in the basic courses relevant to the fields of engineering.

The academic programme component must consist of a minimum total **135 SLT credits** (not including credits for remedial courses) based on a 14-week of teaching semester, made up as follows:

- (a) A **minimum of 90 SLT credits** shall be **engineering courses** consisting of engineering sciences and engineering design/projects appropriate to the student's field of study.
- (b) The **remaining SLT credits** 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 memorisation of details and facts. The curriculum shall also provide students with ample opportunities for analytical, critical, constructive, and creative thinking, and evidence-based decision making in dealing with complex engineering problems. The curriculum shall include sufficient elements for training students in rational thinking and research methods.

Typical core contents for selected traditional engineering disciplines are shown in Appendix B of this Manual. The curriculum shall encompass the **complex problem solving, complex engineering activities** and **knowledge profile**, as summarised in Sections (d), (e), and (f) in the same Appendix.

### SLT Credit

The SLT credit is based on the Student Learning Time (SLT) as defined in the Malaysian Qualification Framework (MQF). The 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, 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 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 guideline shall be followed:

- Industrial training shall be for a minimum of eight (8) weeks of continuous training. One (1) credit is allocated for every two (2) weeks of training subjected to a maximum of six (6) credit. The training shall be adequately structured, supervised and recorded in log books/report. The industrial training must be conducted before the final semester.

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

- A final year project is subjected to a minimum of six (6) credits and a maximum of twelve (12) credits.

**Notes:****➤ Tutorial**

Tutorial is 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.

**➤ Laboratory Work**

Students should receive sufficient laboratory work to complement engineering theory that is learnt through lectures. The laboratory should help students develop competence in executing experimental work. Students should work in groups, preferably not more than five (5) in a group. It is expected that laboratory works shall involve open-ended exercises to be conducted by students with clear COs and POs.

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

**➤ Industrial Training**

Exposure to professional engineering practice is a key element in differentiating an engineering degree from an applied science degree.

Familiarity with all common engineering processes is essential and exposure at a practical level to a wide variety of processes is required at a level appropriate to the young professional. Whilst it is clearly desirable for students to get a feel of the skills involved, the central aim of the Industrial Training is to achieve appreciation, not 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. It is considered that there is no real substitute for first-hand experience in an engineering-practice environment, other than exposure to the industrial environment outside the IHL.

There should be a structured industrial training and supervision by a qualified personnel. Industrial training is a key component of learning in an integrated academic curriculum. Due to its importance, the programme shall have a minimum of eight (8) weeks of continuous industrial training for each student.



➤ **Exposure to Engineering Practice**

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

- (i) Lectures/talks by guest lecturers from industry.
- (ii) Academic staff with industrial experience.
- (iii) Courses on professional ethics and code of conduct.
- (iv) Industry visits.
- (v) Industry-based project.
- (vi) Regular use of a logbook in which industrial experiences are recorded.

➤ **Final-Year Project**

The final-year project should preferably industry related, and can provide one of the best means of introducing an investigative research oriented approach to engineering studies. 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. The student among others is expected to develop techniques in literature review and information processing, as necessary with all research approaches.

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

➤ **Integrated Design Projects**

Integrated Design Projects (IDP) shall involve complex engineering problems and design systems, components or processes integrating (culminating) core areas and meeting specified needs with appropriate consideration for public health and safety, cultural, societal, project management, economy, and environmental considerations where appropriate.

The IDPs are multifaceted assignment that serves as a culminating academic and intellectual experience for students, typically towards the end of an academic programme or learning-pathway experience.

The IDP should involve students working in group. The programme should seize the opportunity to deliver and assess many relevant POs through the Integrated project.

➤ **Condition for Passing Courses**

The IHLs must ensure that no students shall pass a course if they fail in their final examination of that course, unless the continuous assessment approach adopted can demonstrate the attainment of the depth of knowledge.

#### 6.4 Criterion 4: Students

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

Students intending to pursue engineering programmes shall have a good understanding of mathematics and physical sciences. The normal entry qualification is STPM (with good principal passes in mathematics and physical sciences) or its equivalent.

IHLs shall ensure that students, who do not meet the above criteria, undertake suitable remedial programmes in order to attain the equivalent entry qualification. IHLs must put in place clear policies and mechanism for Credit Exemption/Transfer to allow alternative educational pathways.

Credit Exemption/Transfer may be done in two categories as follows:

- a. Credit and Course Exemption from lower to higher level, i.e. **accredited/recognised** Diploma to Bachelor degree. A maximum Credit and Course Exemption of 30% of the total programme credits is allowed.
- b. Credit Transfer between **accredited/recognised** programmes of same level, i.e. from Bachelor to Bachelor degree. A maximum Credit Transfer of 50% of the total programme credits is allowed.

The programme shall provide the necessary teaching-learning environment to support the achievement of the PEOs and POs. 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.

The programme should demonstrate the necessary avenues for students to get their feedback and suggestions on improving the programme such as committee, forum, feedback services, and so on.

Students shall not be over burdened with workload that may be beyond their ability to cope with. However, adequate opportunities, such as involvement in co-curricular

activities in student clubs, competitions, sports and campus activities shall be provided for students to develop their character apart from academic development.

### 6.5 Criterion 5: Academic and Support staff

A viable engineering programme is expected to have a minimum of 8 full-time academic staff whose first degree must be in the appropriate engineering discipline. Every programme shall have at least three (3) full-time Professional Engineers registered with the BEM or equivalent, and actively teach in the programme. All academic staff who are eligible **must** register with BEM.

In addition, IHLs may engage part-time staff with acceptable professional qualifications in the related engineering fields. The full-time equivalent of part-time staff shall not exceed 40%.

Academic staff shall have postgraduate degrees (Masters level or higher). However, a staff member with a recognised first degree and long industrial/specialist experience with acceptable professional qualifications may be considered.

It must be demonstrated that the academic staff have the competencies to cover all areas of the programme, and are implementing the outcome-based approach to education. The overall competence of the academic staff may be judged by such factors as education, diversity of background, engineering experience, teaching experience, ability to communicate, enthusiasm for developing more effective programmes, level of scholarship, participation in professional societies and attainment of Professional Engineer status. The IHL should ensure its staff gain the necessary industrial experience required to achieve professional status.

The full-time equivalent academic staff to student ratio shall ideally be 1:20 or better to ensure effective teaching, student-staff interaction, student advising and counselling, IHL service and research 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.

### 6.6 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 POs.

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.

Sufficient and appropriate experimental facilities must be available for students to gain substantial experience in understanding and operating engineering equipment and of designing and conducting experiments. The equipment must be reasonably representative of modern engineering practice. Where practical work 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. The IHL shall comply with any or all applicable rules or regulations pertaining to safety, health and environment.

For programmes offered wholly or partly in distance mode, or 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.

## **6.7 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 PEOs and POs. 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 programmes together with the academic and professional development of its staff.

### **6.7.1 Institutional Support, Operating Environment, and Financial Resources**

The IHL must regard quality engineering 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 academic 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 programme. The IHL must have sufficient financial resources to acquire, maintain, and operate facilities and equipment appropriate for the engineering programme.

### 6.7.2 Programme Quality Management and Planning

The IHL's processes for programme planning, curriculum development, and regular curriculum and content review must involve all academic staff. The processes include reviewing PEOs and POs, tracking the contributions of individual Course Outcomes (COs) to the POs, 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.

The IHL must demonstrate appropriate benchmarking is carried out with similar accredited/recognised programme(s) offered at other IHLs.

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.

### 6.7.3 External Assessment and Advisory System

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

The external examiner is a person of high academic standing in the engineering discipline. 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. Evaluation is to be made at least once in every two (2) years.

The IHL shall have an industry advisory panel for participation by professional engineers, and employers of engineers 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.

#### 6.7.4 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 including credit and course transfer/exemption.
- (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.

#### 6.7.5 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.

### 7.0 Accreditation Documents

#### 7.1 New Programme (First-cycle) or New-cycle Accreditation or Approval of New Programme

The IHL applying or reapplying (in deferment case) for accreditation of new programme (first-cycle) or new-cycle accreditation, or approval of new programme, 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 application, unless otherwise stated, the IHL shall submit the following documents:

- (i) A completed Self-Assessment Report (SAR) (as noted in Section 7.3) – Hardcopy and digital format.
- (ii) Supporting and other relevant Documents (as noted in Section 7.4) – Digital format.

- (iii) A completed Appendix C (Checklist of Documents for Accreditation/Approval of New Programme and Relevant Information).

Institutional Documents and Additional Documentation (as noted in Section 7.5) are to be made available during the visit.

## 7.2 Interim and Continuing Programmes Accreditation

For programme that has been accorded accreditation with interim conditions, or programme applying for extension of accreditation in the same cycle, unless otherwise stated, the IHL shall submit the following documents:

- (i) The earlier SAR prepared for previous accreditation visit (as noted in Section 7.3) – Hardcopy and digital format.
- (ii) An addendum to the SAR – Hardcopy and digital format.

The addendum shall include:

- **Report related to concerns listed under accreditation conditions. Self-assess the closing of concerns, substantiated with evidences of actions taken to close the concerns, and results achieved from the actions. Summarise the closing of concerns in a tabular form.**
- Updates on the fulfilment of the eight (8) Qualifying Requirements.
- Report of how the programme is addressing (closing the gap) newly introduced/revised accreditation requirements by the EAC (if any).
- Updates on any changes in information, data, statistics, status, policies, etc., and report on Continual Quality Improvement (CQI) activities related to the seven (7) accreditation criteria. These may involve for example change of programme name, PEO or PO statements, OBE model, academic curriculum (structure or content), students' entry requirements, number of academic or support staff, number of academic staff with professional qualifications, staff student ratio, facilities, QMS.
- Report on action taken to address issues listed under OFI in the previous accreditation visit with CQI being put into practice, where appropriate.
- Any other related matters to be highlighted in any section/criteria.

- (iii) Supporting and other relevant Documents – Digital format.

Institutional Documents and Additional Documentation (as noted in Section 7.5) are to be made available during the visit.

## 7.3 Self-Assessment Report – Hardcopy

A Self-Assessment Report (SAR) 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 **including its self-evaluation of the outcomes and subsequent corrective actions** to enable the Evaluation Panel to objectively assess the programme for 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 Manual. In other words, this summary document is a form of self-assessment of the IHL's programme outcomes attainment.

The general structure of the SAR shall follow the guidelines as described in, but not limited to, **Sections 7.3.1 to 7.3.9** in conjunction with Appendix C of this Manual. Appendix G provides sample formats for presenting some required information.

The submission must be comprehensive, readable, self-contained and provide a coherent overview with the text addressing each major point in a definitive manner. It must be concise with 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 requiring the EAC to find the relevant information. The IHL is advised to provide accurate information as required by this Accreditation Manual, for verification by the Evaluation Panel during the visit.

### **7.3.1 General Information and Programme Accreditation History**

- (i) Provide general information on the IHL and the specific programme.
- (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 the programme and state the year the changes were introduced.

### **7.3.2 Programme Educational Objectives (PEOs)**

- (i) State the vision and mission of the IHL and/or faculty.
- (ii) List the PEOs and state where they are published or publicised.
- (iii) Describe how the PEOs are consistent with the vision and mission of the IHL and/or faculty and stakeholders' requirements.
- (iv) Describe the definition or PEO elements/performance indicators, achievement criteria, and performance targets.
- (v) Describe the processes used to establish/formulate, define elements/performance indicators, setting achievement criteria and performance targets, and review the PEO statements. This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.



- (vi) Describe the processes used to evaluate the level of achievement of the PEOs. This includes describing graduates/alumni database, tools (survey, meetings, interviews, etc.) and frequency of activities and timelines.
- (vii) Discuss the PEOs achievement results by the graduates/alumni.
- (viii) Describe how the feedback and results obtained from the above processes are being used for the CQI of the programme.
- (ix) Describe the extent to which the programme's various stakeholders are involved in these processes.
- (x) Describe CQI strategies to be implemented in relation to PEOs.
- (xi) Self-assess on programme performance related to PEOs based on the following scale (with justifications) referring to Appendix H of this Manual:

\*Poor/Satisfactory/Good

### 7.3.3 Programme Outcomes (POs)

- (i) List down the POs and state where are they published or publicised.
- (ii) Describe how the POs relate to the PEOs.
- (iii) Describe how the POs encompass and are consistent with the 12 EAC's POs of Section 6.2.
- (iv) Describe the PO definition or elements/performance indicators.
- (v) Describe the processes used to establish/formulate, define PO elements/performance indicators, and review the PO statements. This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.
- (vi) Describe the OBE model adopted to deliver, assess and evaluate achievement of the POs. Highlight how **direct** assessments (as primary evidence) of the achievement of the POs by the Programme are reached. Give example on how the assessment from related COs from various courses that are mapped to a particular PO are used in determining the attainment of the POs, i.e. elaborate on the POs achievement criteria and performance targets. Similar description for student assessments and attainment may be given.
- (vii) Describe the processes used to establish the model to deliver, assess and evaluate (with achievement criteria and performance targets) of the POs.
- (viii) Discuss the data gathered and explain the results of the assessment and evaluation of each PO.
- (ix) Describe how the feedback and results obtained from the above processes are being used for the CQI at both the course and programme levels, and/or improving individual student's performance.
- (x) Describe any PO management system (computer software etc.) used by the programme, including screen captures of OBE management system (computer software).

- (xi) Describe the extent to which the programme's various stakeholders are involved in the processes.
- (xii) Describe CQI strategies to be implemented in relation to POs.
- (xiii) Self-assess on programme performance related to POs based on the following scale (with justifications):

\*Poor/Satisfactory/Good

#### 7.3.4 Academic Curriculum

- (i) Describe 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 POs.
- (ii) Describe the programme delivery and assessment (include description of assessment rubrics for projects, case studies, etc. and non-cognitive POs) methods, 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 POs.
- (iii) The information required in items (i) and (ii) should include but is not limited to the following:
  - A matrix linking courses to POs to identify and track the contribution of each course to the POs. IHL may adopt the sample overall 'Courses to POs' mapping matrix included in Appendix G of this Manual to identify and track the contribution of the courses to the POs as a guiding template. IHL may adopt own mapping strategy that may be different from the sample template.
  - Distribution of the engineering courses according to areas specific to each programme referring to underpinning Engineering Sciences, Principles, and Applications for traditional courses (Civil, Mechanical, Electrical, Chemical and Electronics) of Appendix B and areas obtained from benchmarking exercises with established programme elsewhere for non-conventional programmes.
  - Mapping of the courses to the Knowledge Profile in Appendix B.
  - Distribution of the related non-engineering (general education) courses.
  - Distribution of the courses offered according to semester.

**(Note:** Samples of table formats are available in Appendix G).
- (iv) Describe how benchmarking report/s and other feedback (from EAC, IAP, External Examiner, etc.) have resulted in Academic Curriculum improvement.
- (v) Describe how the requirements of Complex Problem Solving (CPS) and Complex Engineering Activities (CEA) have been addressed.

- (vi) Describe laboratory exercises, related POs, and approach to deliver and assess. Give examples of open-ended laboratory activities.
- (vii) Describe industrial training scheme and relate it to POs using appropriate examples.
- (viii) Describe exposure to professional practice and relate it to POs. Cite examples of exposure to professional practice activities.
- (ix) Describe Final Year Projects (FYPs), related POs, and how FYPs fulfil the specific requirements stipulated in the Manual.
- (x) Describe Integrated Design Projects, related POs, and how the projects fulfil the specific requirements stipulated in the Manual.
- (xi) Describe the 'Condition for Passing Courses' practice(s).
- (xii) Describe the extent to which the programme's various stakeholders are involved in the curriculum development and review process.
- (xiii) Describe CQI strategies to be implemented in relation to Academic Curriculum.
- (xiv) Self-assess on programme performance related to Academic Curriculum based on the following scale (with justifications):

\*Poor/Satisfactory/Good

### 7.3.5 Students

- (i) Describe the requirements and process for admission of students to the programme.
- (ii) Describe the policies and processes for credit and course transfer/exemption.
- (iii) Describe students' counselling services available.
- (iv) Describe formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement, and how have the feedback resulted in programme improvement.
- (v) Describe students' workload.
- (vi) Describe students' activities and involvement in student organisations and relevant professional engineering bodies that provide experience in management and governance, representation in education and related matters and social activities.
- (vii) The information required in items (i) to (vi) 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).

- (viii) Discuss students' performances in relation to POs from overall holistic perspective involving both curricular and co-curricular activities, such as participating in design competitions, public speaking activities, etc.
- (ix) Describe CQI strategies to be implemented in relation to Students.
- (x) Self-assess on programme performance related to Students based on the following scale (with justifications):

\*Poor/Satisfactory/Good

### 7.3.6 Academic and Support Staff

- (i) Discuss the adequacy and competencies of the academic staff in covering all areas of the programme, and in implementing the Outcome-based approach to education. The overall competence of Academic staff is viewed from their diversity of background, academic qualification, academic and professional practice experiences, including their track record in teaching, research, publications, administration and service to the society, ability to communicate, enthusiasm for developing more effective programmes, level of scholarship, participation in professional societies and attainment of Professional Engineer status.
- (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 academic staff (full-time, part-time and inter-programme) by year for the past four years (Table 8 in Appendix G).
  - An analysis of all academic staff (Table 9 in Appendix G).
  - A summary of the academic qualifications of academic staff (Table 10 in Appendix G).
  - A summary of the professional qualifications and membership in professional bodies/societies of academic staff (Table 11 in Appendix G). This shall also include registration with Board of Engineers Malaysia in line with the requirement.
  - A summary of the posts held by full time academic staff (Table 12 in Appendix G).
  - A summary of teaching workload of academic 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.
- (v) Describe the implemented professional training scheme and incentives for academic staff. List down academic staff who have undergone or still undergoing training. Provide future projected professional training programme.
- (vi) Describe participation of academic staff in consultancy activities.
- (vii) Describe participation of academic staff in research and development activities.
- (viii) Describe CQI strategies to be implemented in relation to Academic and Support Staff.
- (ix) Self-assess on programme performance related to Academic and Support Staff based on the following scale (with justifications):

\*Poor/Satisfactory/Good

### 7.3.7 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.
- (v) Describe procedures and monitoring of health, safety and environmental aspects of facilities including lecture halls, laboratories, equipment, etc.
- (vi) Describe maintenance and calibration aspects of teaching facilities and equipment/apparatus.
- (vii) Discuss how the safety, health and environment issues being managed by the IHL.
- (viii) Describe CQI strategies to be implemented in relation to Facilities.
- (ix) Self-assess on programme performance related to Facilities based on the following scale (with justifications):

\*Poor/Satisfactory/Good

### 7.3.8 Quality Management Systems

- (i) Describe the Quality Management Systems and organisational structure of the IHL as well as the structure within the faculty/department/programme. Discuss the commitment and level and adequacy of institutional support, operating environment, financial resources, constructive leadership, policies and mechanisms for attracting, appointing, retaining and rewarding well-qualified staff and provision of professional development, and provision of infrastructure and support services to achieve the PEOs and POs and assure continuity/sustainability 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 Advisory Panel (IAP), students and alumni; tracking the contribution of individual courses to the POs; tracking outcomes of performance through assessment; responding to External Examiners comments; reviewing of PEOs and POs; and Continual Quality Improvement (CQI). 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 feedback obtained from all stakeholders (External Examiner, IAP, students and alumni, etc.) and how CQI was carried out.

- (iv) Summarise benchmarking reports and how CQI was carried out.
- (v) Describe how the Quality Management System (QMS) of the IHL provides quality assurance covering (not limited to) the following:
  - System for Examination Regulations including Preparation and Moderation of Examination Papers: The programme has established a working system for examination regulations including preparation and moderation of examination papers.
  - System of Assessment for Examinations, Projects, and Industrial Training: The programme has established a working system for assessment of examinations, projects, industrial training and other forms of learning delivery. The scope of assessment is wide enough to cover the achievement of POs.
  - System for student admission and teaching and learning: The programme has established a working system for student admission and teaching and learning.

Quality assurance can be reflected through proper and sufficient policies/rules/regulations/procedures in the Department/Faculty or IHL, and whether those systems are implemented.

- (vi) Describe the management system for safety, health and environment.
- (vii) Describe CQI strategies to be implemented in relation to QMS.
- (viii) Self-assess on programme performance related to Quality Management Systems (QMS) based on the following scale (with justifications):

\*Poor/Satisfactory/Good

### 7.3.9 Other Relevant Information

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

## 7.4 Supporting Material Document – Digital Format

The supporting documents are evidences to substantiate claims made in the SAR by IHL. These documents are to be submitted in digital format as Appendices to the SAR as follows:

### 7.4.1 General Information and Programme Accreditation History

- (i) Provide official publications relating to the Faculty/School/Department/Programme, undergraduate prospectus and other information accessible through website.

- (ii) Provide programme's previous accreditation history, reports, relevant letters, and other relevant documents.

#### **7.4.2 Programme Educational Objectives (PEOs)**

- (i) Provide documented evidences of publication of vision and mission statements.
- (ii) Provide documented evidences of publication or dissemination of PEO statements.
- (iii) Provide documented evidences of publication or dissemination of definition or PEO elements/performance indicators, achievement criteria, and performance targets.
- (iv) Provide sample responded questionnaires/survey forms and/or other tools used to establish/formulate/define PEO elements/performance indicators, and review the PEOs.
- (v) Provide sample responded questionnaires/survey forms and/or other tools used to evaluate achievement of the PEOs.
- (vi) Provide documented evidences of how the processes and results obtained from the processes resulted in the CQI of the programme.
- (vii) Provide documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to PEOs, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.

#### **7.4.3 Programme Outcomes (POs)**

- (i) Provide documented evidences of publication or dissemination of PO statements.
- (ii) Provide documented evidences of publication or dissemination of definition of PO elements/performance indicators.
- (iii) Provide sample responded questionnaires/survey forms and/or other tools used to establish/formulate/define PO elements/performance indicators, and review of the POs.
- (iv) Provide documented evidences of publication or dissemination of the OBE model adopted to deliver, assess and evaluate achievement of the POs.
- (v) Provide 'PO box/tray' for each PO, to cover from mapping of courses to the selected POs, until the results of the PO achievements (based the adopted model), and CQI process.



- (vi) Provide documented evidences of OBE management system (computer software etc.).
- (vii) Provide documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to POs, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.

#### 7.4.4 Academic Curriculum

- (i) Provide documented evidences of publication or dissemination of overall 'Courses to POs' mapping matrix.
- (ii) Provide documented evidences of publication or dissemination of the elaboration/definition of CPS, CEA and Knowledge Profile.
- (iii) Provide list of titles of experiments in the laboratory and documented evidences showing open-ended laboratory activities.
- (iv) Provide list of companies that offered industrial training for students.
- (v) Provide list of exposure to professional practice activities and describe the level of student's engagement.
- (vi) Provide list of final-year project titles.
- (vii) Provide Integrated Design project's synopsis and list of titles.
- (viii) Provide documented evidences showing programme implementation of the 'Condition for Passing Courses'.
- (ix) Provide documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to Academic Curriculum, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.

#### 7.4.5 Students

- (i) Provide documented evidences showing the students admission requirements to the programme.
- (ii) Provide documented evidences showing the policies and processes for credit transfer/exemption.
- (iii) Provide documented evidences showing available students' counselling services.

- (iv) Provide documented evidences showing formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement.
- (v) Provide documented evidences showing students' involvement in student organisations and relevant professional engineering bodies that provide experience in management and governance, representation in education and related matters, non-academic or co-curricular activities, and social activities.
- (vi) Provide documented evidences showing students' performance in relation to PO from an overall holistic perspective, from both curricular and co-curricular activities, such as participating in design competition, public speaking activities, etc.

#### **7.4.6 Academic and Support Staff**

- (i) Provide documented evidences of staff training to ensure real understanding and implementation of OBE, as well as other training such as effective communication skills, teamwork, leadership, etc.
- (ii) Provide documented evidences showing participation of academic staff in professional training and qualifications, and programme's projection/plan on professional training schemes for academic staff.
- (iii) Provide documented evidences showing participation of academic staff in consultancy activities.
- (iv) Provide documented evidences showing participation of academic staff in research and development activities.

#### **7.4.7 Facilities**

- (i) Provide a list of all equipment and software used by the programme including recent additions and planned additions, as well as the titles of books, and journals for the programme.
- (ii) Provide documented evidences of procedures and monitoring of health, safety and environmental aspects of facilities including lecture halls, laboratories, equipment, etc.
- (iii) Provide documented evidences of maintenance and calibration of facilities and equipment/apparatus in the laboratories or elsewhere.

#### **7.4.8 Quality Management System (QMS)**

Provide documented evidences of:

- (i) QMS and organisational structure.
- (ii) Available policies.
- (iii) Standard Operating Procedures (SOP), or ISO or other certifications.
- (iv) Relevant files (including course files) and documentations.
- (v) Relevant minutes of meeting related to QMS, such as from IAP's meetings, Quality Committee meeting, etc.
- (vi) Management system for safety, health and environment.
- (vii) Letters of appointment of IAP, External Examiner(s), and committee members, etc.
- (viii) External Examiners' reports.
- (ix) Benchmarking report/s.
- (x) Responses to close the loop of feedback from stakeholders.

#### **7.5 Institutional Documents and Additional Documentation to be Made Available during the Visit – Hardcopy.**

The Institutional Documents and Additional Documentation shall be made available during the visit in hardcopies or other tangible forms. They are to support the information/evidences requested in Sections 7.3 and 7.4 for verification purposes by the Evaluation Panel.

These documents are either hardcopies of the supporting documents already provided by the IHL during the SAR submission digital format, or additional documents to further support the supporting documents, or evidences not submitted with the SAR but to be viewed during the visit. These may include:

- (i) The IHL/programme's handbook, undergraduate prospectus, academic calendar or other official publications 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.
- (ii) Completed questionnaire survey forms.
- (iii) Documents related to IAP activities.
- (iv) Documents related to training workshops related to OBE and Curriculum development.
- (v) OBE user manual.
- (vi) PO trays/boxes for each of the 12 EAC's POs.

- (vii) OBE management software (if any).
- (viii) 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). Examination papers complete with answer scheme and graded examination papers with low, medium and high grades are also to be provided. 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, and any other materials used for the course are also to be included. Sample of projects with low, medium and high grades are also to be provided. Assessment rubrics or projects and non-cognitive outcomes shall be included.
- (ix) Final year project reports and assessment rubrics.
- (x) Integrated design projects and assessment rubrics.
- (xi) Moderation forms for examination papers and other continuous assessments.
- (xii) Laboratory exercises to include experiment instruction sheets, as well as supporting information, and marked laboratory exercises.
- (xiii) Laboratory reports.
- (xiv) Documents related to industrial training (IT)/placement and students' IT report.
- (xv) Documents related to industrial exposure for students (industrial visit, talks, etc.).
- (xvi) Documents related to students' feedback.
- (xvii) Documents related to students' participation in design competition, public speaking activities, etc.
- (xviii) Documents related to industrial attachment/professional scheme for academic staff.
- (xix) Documents related to academic staff attending training, conferences and workshops.
- (xx) Documents related to support staff training.
- (xxi) Documents related to staff industry linked consultancy activities.
- (xxii) Documents related to staff industry linked research activities.
- (xxiii) Documents related to staff promotion exercises.
- (xxiv) Equipment calibration records.
- (xxv) Facilities and equipment maintenance records.
- (xxvi) Documents related to health, safety, and environment.
- (xxvii) IHL/programme annual report.
- (xxviii) Published policies.

- (xxix) External Examiners' report.
- (xxx) Benchmarking reports.
- (xxxi) Minutes of meetings involving all criteria.
- (xxxii) Other relevant documentation/evidences.

## **8.0 Approval Procedure for a New Engineering Programme**

### **8.1 EAC'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 7 and Appendix C) to the EAC and MQA (refer to Appendix F for process) for initial evaluation by the EAC. The recommendation from the EAC 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 a period of three (3) months, it shall be deemed that the IHL no longer intends to conduct the programme.

#### **(b) Initial Evaluation**

The EAC shall appoint an Evaluator 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 be conducted desktop, or may be discussed in meeting/s between the Evaluator and the IHL, or may include a visit to the IHL by the Evaluator.

## **8.2 Report and Recommendation**

The report from the Evaluator shall be submitted to EAC within four (4) weeks after the appointment/visit.

## **8.3 EAC's Decision**

Based on the evaluation, EAC 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 EAC.
- Not to recommend approval.

The recommendation from EAC 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.

## **8.4 Provisional Accreditation**

Approved programme will be accorded provisional accreditation by BEM.

## LIST OF APPENDICES

- Appendix A - Engineering Accreditation Council, Evaluation Panel, Evaluator and Accreditation Appeals Board
- Appendix B - Engineering Content for Selected Engineering Disciplines and Innovative Programmes
- Appendix C - Checklist of Documents for Accreditation\*/Approval of New Programme and Relevant Information
- Appendix D - Evaluation Panel Report
- Appendix E - External Examiner Report
- Appendix F - Process Flow Chart for Application of Accreditation and Approval of Engineering Programmes
- Appendix G - Sample Table Templates for SAR
- Appendix H – Guidelines for Evaluation Panel

APPENDIX A**ENGINEERING ACCREDITATION COUNCIL, EVALUATION PANEL  
AND ACCREDITATION APPEALS BOARD****1.0 ENGINEERING ACCREDITATION COUNCIL**

The Engineering Accreditation Council (EAC), representing BEM, IEM, MQA and JPA, shall be an independent body for the accreditation of engineering programmes.

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

Members of EAC shall be appointed by BEM as follows:

- a) A Chairman (nominated by BEM).
- b) A Deputy Chairman (nominated by IEM).
- c) 15 members representing each of major branches (e.g. Civil, Mechanical, Electrical, Chemical and Electronics) and each of the constituent organisations nominated by BEM, IEM, MQA and JPA.
  - (i) 5 members nominated by BEM
  - (ii) 5 members nominated by IEM
  - (iii) 1 member nominated by JPA
  - (iv) 1 member nominated by MQA
  - (v) 3 members from the major employers of engineers in Malaysia
- d) Ex-Officio: Registrar of BEM.  
Secretary of BEM.

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

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

All members shall be professional engineers, unless not available within the constituent organisation.



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

- ◆ Formulate and update the accreditation policies and criteria.
- ◆ Approve detailed guidelines and operating procedures for accreditation.
- ◆ Oversee all operational arrangements, and appoint members of the Evaluation Panel.
- ◆ Receive evaluation report on engineering programmes, and decide whether accreditation should be granted or otherwise.
- ◆ Establish and maintain a list of local and foreign accredited engineering programmes.
- ◆ Respond to any complaints or appeals concerning the accreditation process and to any proposals for change.
- ◆ Oversee the development and operation of accreditation and mutual recognition of programmes with other countries.
- ◆ Keep the Board informed of the activities of EAC and where necessary make recommendations to the Board.
- ◆ Foster the dissemination of developments and best practices in engineering education.
- ◆ Advise the Board on public statements or representations that should be made in relation to engineering education.
- ◆ Hold consultation meetings with IHLs as and when necessary.
- ◆ Hold meetings at least 6 times per year.

## **2.0 EVALUATION FOR APPROVAL TO CONDUCT A NEW PROGRAMME**

The EAC shall appoint an evaluator 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 EAC and normally consists of:

- a Head of Panel who shall be a Professional Engineer; and
- two members, typically chosen for their broad experience in engineering 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.

All members of the Evaluation Panel shall be professional engineers unless in exceptional circumstances.

#### **4.0 EVALUATOR FOR APPROVAL TO CONDUCT A NEW PROGRAMME**

An Evaluator shall be appointed preferably from amongst EAC member from fields related to the programme being evaluated. In cases where an EAC member is not available, appointment of Evaluator shall be made from amongst Associate Directors or senior Evaluation Panel member.

#### **5.0 ACCREDITATION APPEALS BOARD**

The Accreditation Appeals Board shall consist of the President of BEM, President of IEM and Chief Executive Officer of MQA or their nominated representatives. The President of BEM or his nominated representative shall be the Chairman of the Accreditation Appeals Board.

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.

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**APPENDIX B****ENGINEERING CONTENT FOR SELECTED ENGINEERING DISCIPLINES  
AND INNOVATIVE PROGRAMMES****(a)(i) Engineering Science and Principles for Traditional Programmes**

An accredited programme is expected to cover the broad areas of the respective disciplines at an appropriate level. The following are the underpinning areas to be introduced for the respective traditional programmes/disciplines programmes:

<b>CIVIL</b>	<b>MECHANICAL</b>	<b>ELECTRICAL</b>	<b>CHEMICAL</b>	<b>ELECTRONICS</b>
Strength of Materials	Materials	Circuits and Signals	Chemical Thermo-dynamics	Circuits and Signals
Structural Analysis and Design	Statics and Dynamics	Electromagnetic Fields and Waves	Material and Energy Balance	Electromagnetic Fields and Waves
Fluid Mechanics/ Hydraulics	Fluid Mechanics	Instrumentation and Control	Chemical Kinetics and Reactor Design	Instrumentation and Control
Soil Mechanics/ Geotechnical Engineering	Thermo-dynamics and Heat Transfer	Digital and Analogue Electronics	Momentum Transfer	Digital and Analogue Electronics
Civil Engineering Materials	Mechanical Design	Machines and Drives	Heat Transfer	Microprocessor Systems
Statics and Dynamics	Instrumentation and Control	Power Electronics	Mass Transfer	Programming Techniques
Construction Engineering	Vibrations	Electrical Power Generation and High Voltage Engineering	Separation Process	Introduction to Electrical Power System
Surveying	Solid Mechanics	Communications System	Process Design	Computer Architecture

Water Resources and Hydrology	Manufacturing/ Production	Power System Analysis	Process Control and Instrumentation	Communications System
Highway and Transportation	Electrical Power and Machines	Electronic Drives and Applications	Safety and Environmental Protection	Electronic System Analysis and Design
Environmental Studies	Electronics and Micro-processors	Electrical Energy Utilisation	Environmental Studies	Digital signal processing and application
	Computer Aided Engineering		Plant, Equipment Design, and Economics	

### (a)(ii) Engineering Applications

Emphasis on engineering applications in degree programmes aims to ensure that all engineering graduates have a sound understanding of up-to-date industrial practice, in particular:

#### Civil Engineering:

1. To appreciate the characteristics and structural behaviour of materials in a variety of user environments.
2. To be able to analyse and design structural components from these materials.
3. To appreciate the range of construction technology currently available and the skills which they require in people for their use.
4. To appreciate the cost aspects of material selection, construction methods, operation and maintenance in their interaction with design and the delivery of civil engineering facilities and services.
5. To understand the whole process of industrial decision-making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources as well as the business and social environment of engineering.

#### Mechanical Engineering:

1. To appreciate the characteristic behaviour of materials in a variety of user environments.
2. To appreciate the range of manufacturing systems and industry energy currently available and the skills which they require in people for their use.
3. To appreciate the cost aspects of material selection, manufacturing methods, operation and maintenance in their interaction with design and product marketing.

4. To understand the whole process of industrial decision-making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources as well as the business and social environment of engineering.

#### **Electrical and Electronic Engineering:**

1. To appreciate the characteristic behaviour of materials in electrical and electronic systems.
2. To be able to analyse and design electrical and electronic systems from devices/components made of various materials.
3. To understand the concepts of generation, transmission and distribution of low and high voltage power.
4. To appreciate cost effectiveness and energy consumption of component/device equipment selection, manufacturing process and integration process.
5. To appreciate the range of manufacturing methods currently available and the skills which they require in people for their use.
6. To understand the whole process of industrial decision making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources and by the business and social environment of engineering.

#### **Chemical Engineering**

1. To appreciate the physical/chemical characteristics and properties of materials.
2. To be able to adopt these materials in process design and analysis.
3. To calculate and analyse the material and energy flows for a given chemical process.
4. To understand the general sequence of processing steps for any given type of chemical process.
5. To understand the selection or estimation of process operating conditions, selection of process equipment, maintenance and process troubleshooting.
6. To analyse the various types of unit operations and processing steps and to decide their relative advantages or disadvantages on the basis of environment, economics, safety and operability.
7. To understand the various process control schemes for the purpose of maintaining production quality, ensuring process safety and preventing waste.

**(b) Mathematics, Statistics and Computing**

These courses should be studied to a level necessary to underpin the engineering courses of the programme accordingly and with a bias towards application. The use of numerical methods of solution is encouraged, with an appreciation of the power and limitations of the computer for modelling engineering situations. Wherever practicable, it is preferred that mathematics, statistics and computing are taught in the context of their application to engineering problems and it follows that some mathematical techniques may be learnt within other subjects of the course. In addition to the use of computers as tools for calculation, analysis and data processing, the programme should introduce their application in such area as given in the following table:

CIVIL	MECHANICAL	ELECTRICAL	CHEMICAL	ELECTRONICS
Computer Aided Analysis and Design	Computer Aided Design and Manufacture	Mathematical Applications	Computer Analysis and Design	Mathematical Applications
Economics Analysis for Decision Making	Economics Analysis for Decision Making	Statistical and Numerical Techniques	Economics Analysis for Decision Making	Statistical and Numerical Techniques
Databases and Information Systems	Databases and Information Systems	Computer Applications	Numerical Methods and Optimisation	Computer Applications
Operational Research	Operational Research		Operational Research	
Business and Management Systems	On-line Control of Operations and Processes		Databases and Information Systems	
Statistical and Numerical Techniques				

**(c) Evaluating non-Traditional or Innovative Programme**

It is a challenge for an accreditation process to promote innovation, experimentation and dissemination of good practice, while maintaining standards that can be objectively certified nationally and internationally. Innovation by its

nature challenges existing wisdom, but not every programme that departs from existing norms can be said to be innovative or desirable. **All fundamentals required in the programme must be maintained.**

Since this Manual is silent on the broad or underpinning areas of these non-traditional programmes/disciplines, the IHL needs to conduct extensive Academic Curriculum benchmarking exercise with established IHLs conducting similar programme. A good External Examiner report will also help justify the adopted Academic Curriculum.

The EAC accreditation system encourages innovation by minimising prescriptiveness in how the required outcomes are attained. Programme evaluation will always focus on the intent of the criteria and on the demonstrated capability of graduates to enter engineering practice at a professional level. Clearly however, a programme which departs radically from the methods normally thought necessary – for example, by employing only a fraction of the normal complement of staff – may expect a searching examination of method as well as outcomes. The EAC and the Evaluation Panel are expected to be receptive to new approaches, and to use the best judgement available to evaluate the substance and merit of the programme.

Continuing innovation and development can be expected to lead to restatement of the criteria and policy of accreditation.

**(d) Definition of Complex Problem Solving**

The range of **complex problem solving** is defined as follows:

No.	Attribute	<b>Complex problems</b> have characteristic WP1 and some or all of WP2 to WP7:
<b>WP1</b>	Depth of Knowledge Required	Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamental-based, first principles analytical approach.
<b>WP2</b>	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues.
<b>WP3</b>	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.
<b>WP4</b>	Familiarity of issues	Involve infrequently encountered issues.

<b>WP5</b>	Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering.
<b>WP6</b>	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs.
<b>WP7</b>	Interdependence	Are high level problems including many component parts or sub-problems.

(e) **Definition of Complex Engineering Activities**

The range of **complex problem activities** is defined as follows:

<b>No.</b>	<b>Attribute</b>	<b>Complex activities</b> mean (engineering) activities or projects that have some or all of the following characteristics:
<b>EA1</b>	Range of resources	Involve the use of diverse resources (and for this purpose resources includes people, money, equipment, materials, information and technologies).
<b>EA2</b>	Level of interactions	Require resolution of significant problems arising from interactions between wide ranging or conflicting technical, engineering or other issues.
<b>EA3</b>	Innovation	Involve creative use of engineering principles and research-based knowledge in novel
<b>EA4</b>	Consequences to society and the environment	Have significant consequences in a range of contexts, characterised by difficulty of prediction and mitigation.
<b>EA5</b>	Familiarity	Can extend beyond previous experiences by applying principles-based approaches.

(f) **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 to 5 years of study, depending on the level of students at entry.

No.	Knowledge Profile
<b>WK1</b>	A systematic, theory-based understanding of the <b>natural sciences</b> applicable to the discipline.
<b>WK2</b>	Conceptually-based <b>mathematics</b> , numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
<b>WK3</b>	A systematic, theory-based formulation of <b>engineering fundamentals</b> required in the engineering discipline.
<b>WK4</b>	Engineering <b>specialist knowledge</b> that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
<b>WK5</b>	Knowledge that supports <b>engineering design</b> in a practice area.
<b>WK6</b>	Knowledge of <b>engineering practice</b> (technology) in the practice areas in the engineering discipline.
<b>WK7</b>	<b>Comprehension of</b> the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.
<b>WK8</b>	Engagement with selected knowledge in the <b>research literature</b> of the discipline.

## APPENDIX C

## ENGINEERING ACCREDITATION COUNCIL

## Checklist of Documents for Accreditation\*/Approval of New Programme\*\* and Relevant Information

Please tick:

Accreditation

Approval of New Programme

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

	Qualifying Requirements for Application Programme Accreditation	Yes/No
1	Outcome-based Education (OBE) implementation.	
2	A minimum 135 credits of which 90 credits must be engineering courses offered over a period of four years. (Based on SLT)	
3	Integrated design project.	
4	Final year project (minimum six (6) credits).	
5	Industrial training (minimum of eight (8) weeks).	
6	Full-time academic staff (minimum of eight (8)) with at least three (3) Professional Engineers registered with the BEM or equivalent.	
7	Staff: student ratio of 1: 20 or better	
8	External examiner's report.	

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 respond to this Appendix wherever applicable.

## INTRODUCTION

This Appendix contains checklist of Documents for Accreditation/Approval of New Programme and Relevant Information as follows:

1. Section A to I: Self-Assessment Report (SAR) to be submitted in hardcopies.
2. Section J: Supporting documents to be submitted in digital format with the SAR.

## A GENERAL INFORMATION

No.	Refer to Section 7.3.1	To be filled out by the IHL where applicable	Checked by EAD
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	EAC 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.	Refer to Section 7.3.1	To be filled out by the IHL where applicable	Checked by EAD
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 CRITERION 1: PROGRAMME OBJECTIVES (PEOs)**

No.	Refer to Sections 6.1 and 7.3.2	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	State the vision and mission of the IHL and/or faculty.		
2	List the PEOs and state where they are published or publicised.		
3	Describe how the PEOs are consistent with the vision and mission of the IHL and/or faculty and stakeholders' requirements.		
4	Describe the definition or PEO elements / performance indicators, achievement criteria, and performance targets.		
5	Describe the processes used to establish / formulate, define elements / performance indicators, setting achievement criteria and performance targets, and review the PEO statements. This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.		
6	Describe the processes used to evaluate the level of achievement of the PEOs. This includes describing graduates/alumni database, tools (survey, meetings, interviews, etc.) and frequency of activities and timelines.		

7	Discuss the PEOs achievement results by the graduates/alumni.		
8	Describe how the feedback and results obtained from the above processes are being used for the CQI of the programme.		
9	Describe the extent to which the programme's various stakeholders are involved in these processes.		
10	Describe CQI strategies to be implemented in relation to PEOs.		
11	Self-assess on programme performance related to PEOs based on the following scale (with justifications) referring to Appendix H of this Manual:  *Poor/Satisfactory/Good		

#### D CRITERION 2: PROGRAMME OUTCOMES (POs)

No.	Refer to Sections 6.2 and 7.3.3	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	List down the POs and state where are they published or publicised.		
2	Describe how the POs relate to the PEOs.		
3	Describe how the POs encompass and are consistent with the 12 EAC's POs of Section 6.2.		
4	Describe the PO definition or elements/performance indicators.		
5	Describe the processes used to establish/formulate, define PO elements/performance indicators, and review the PO statements. This includes describing the tools used in the processes (survey, meetings, interviews, etc.) and frequency of activities and timelines.		
6	Describe the OBE model adopted to deliver,		

	<p>assess and evaluate achievement of the POs. Highlight how direct assessments (as primary evidence) of the achievement of the POs by the students are reached. Give example on how the assessment from related COs from various courses that are mapped to a particular PO are used in determining the achievement of the POs by the students, i.e. elaborate on the POs achievement criteria and performance targets.</p>		
7	<p>Describe the processes used to establish the model to deliver, assess and evaluate (with achievement criteria and performance targets) of the POs.</p>		
8	<p>Discuss the data gathered and explain the results of the assessment and evaluation of each PO.</p>		
9	<p>Describe how the feedback and results obtained from the above processes are being used for the CQI at both the course and programme levels, and/or improving individual student's performance.</p>		
10	<p>Describe any PO management system (computer software etc.) used by the programme, including screen captures of OBE management system (computer software).</p>		
11	<p>Describe the extent to which the programme's various stakeholders are involved in these processes.</p>		
12	<p>Describe CQI strategies to be implemented in relation to POs.</p>		
13	<p>Self-assess on programme performance related to POs based on the following scale (with justifications): *Poor/Satisfactory/Good</p>		

**E CRITERION 3: ACADEMIC CURRICULUM**

No.	Refer to Sections 6.3 and 7.3.4	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	Describe 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 POs.		
2	Discuss the programme delivery and assessment (include description of assessment rubrics for projects, case studies, etc. and non-cognitive POs) methods, 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 POs.		
3	<p>The information required in items 1 and 2 above should include but is not limited to the following:</p> <ul style="list-style-type: none"> <li>○ A matrix linking courses to POs to identify and track the contribution of each course to the POs. IHL may adopt the sample overall 'Courses to POs' mapping matrix included in Appendix G of this Manual to identify and track the contribution of the courses to the POs may be referred to as a guiding template. IHL may, however, adopt own mapping strategy that may be different from the sample template.</li> <li>○ Distribution of the engineering courses according to areas specific to each programme referring to Appendix B underpinning Engineering Sciences, Principles, and Applications) for traditional courses (Civil, Mechanical, Electrical, Chemical and Electronics), and areas obtained from benchmarking exercises with established programme elsewhere for</li> </ul>		

	<p>non-conventional programmes.</p> <ul style="list-style-type: none"> <li>○ Mapping of the courses to the Knowledge Profile in Appendix B.</li> <li>○ Distribution of the related non-engineering (general education) courses.</li> <li>○ Distribution of the courses offered according to semester.</li> </ul> <p><b>(Note:</b> Samples of table formats are available in Appendix G).</p>		
4	Describe how benchmarking report/s and other feedback (from EAC, IAP, External Examiner, etc.) have resulted in Academic Curriculum improvement.		
5	Describe how the requirements of Complex Problem Solving (CPS) and Complex Engineering Activities (CEA) have been addressed.		
6	Describe laboratory exercises, related POs, and approach to deliver and assess. Give examples of open-ended laboratory activities.		
7	Describe industrial training scheme and relate it to POs using appropriate examples.		
8	Describe exposure to professional practice and relate it to POs. Cite examples of exposure to professional practice activities.		
9	Describe Final Year Projects (FYP), related POs, and how FYP fulfils the specific requirements stipulated in the Manual.		
10	Describe Integrated Design Projects, related POs, and how IDP fulfils the specific requirements stipulated in the Manual.		
11	Describe the 'Condition for Passing Courses'.		
12	Describe the extent to which the programme's various stakeholders are involved in the curriculum development and		



	review process.		
13	Describe CQI strategies to be implemented in relation to Academic Curriculum.		
14	Self-assess on programme performance related to Academic Curriculum based on the following scale (with justifications): *Poor/Satisfactory/Good		

#### F CRITERION 4: STUDENTS

No.	Refer to Sections 6.4 and 7.3.5	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	Describe the requirement and process for admission of students to the programme.		
2	Describe the policies and processes for credit transfer/exemption.		
3	Describe students' counselling services available.		
4	Describe formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement, and how have the feedback resulted in programme improvement.		
5	Describe students' workload.		
6	Describe students' activities and involvement in student organisations and relevant professional engineering bodies that provide experience in management and governance, representation in education and related matters and social activities.		
7	The information required in items 1 to 6 above should include but is not limited to the following:		

	<ul style="list-style-type: none"> <li>○ The distribution of students' enrolment for all academic years for the past four years (Table 6 in Appendix G).</li> <li>○ The entry qualifications of final year students of the current semester (Table 7 in Appendix G).</li> </ul>		
8	Discuss students' performance in relation to POs from overall holistic perspective involving both curricular and co-curricular activities, such as participating in design competitions, public speaking activities, etc.		
9	Describe CQI strategies to be implemented in relation to Students.		
10	Self-assess on programme performance related to Students based on the following scale (with justifications): *Poor/Satisfactory/Good		

## G CRITERION 5: ACADEMIC AND SUPPORT STAFF

No.	Refer to Sections 6.5 and 7.3.6	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	Discuss the adequacy and competencies of the academic staff in covering all areas of the programme, and in implementing the Outcome-based approach to education. The overall competence of Academic staff is viewed from their diversity of background, academic qualification, academic and professional practice experiences, including their track record in teaching, research, publications, administration and service to the society, ability to communicate, enthusiasm for developing more effective programmes, level of scholarship, participation in professional societies and attainment of Professional status from the BEM.		
2	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.		
3	Discuss the sufficiency and competency of technical and administrative staff in providing adequate support to the educational programme.		
4	<p>The information required in items 1 to 3 above should include but is not limited to the following:</p> <ul style="list-style-type: none"> <li>○ A breakdown in terms of numbers of academic staff (full-time, part-time and inter-programme) by year for the past four years (Table 8 in Appendix G).</li> <li>○ An analysis of all academic staff (Table 9 in Appendix G).</li> <li>○ A summary of the academic qualifications of academic staff (Table 10 in Appendix G).</li> <li>○ A summary of the professional qualifications and membership in professional bodies/societies of academic staff (Table 11 in Appendix G). This shall also include registration with Board of Engineers Malaysia in line with the requirement.</li> <li>○ A summary of the posts held by full time academic staff (Table 12 in Appendix G).</li> <li>○ A summary of teaching workload of academic staff for the current semester (Table 13 in Appendix G).</li> <li>○ An analysis of all support staff (Table 14 in Appendix G).</li> <li>○ A summary of the posts held by support staff (Table 15 in Appendix G).</li> <li>○ The staff: student ratio by year for all academic years for the past four years</li> </ul>		

	(Table 16 in Appendix G). ○ A listing of lecturers/invited speakers from industry/public bodies and their level of involvement.		
5	Describe the implemented professional training scheme and incentives for academic staff. List down academic staff who have undergone or still undergoing training. Provide future projected professional training programme.		
6	Describe participation of academic staff in consultancy activities.		
7	Describe participation of academic staff in research and development activities.		
8	Describe CQI strategies to be implemented in relation to Academic and Support Staff.		
9	Self-assess on programme performance related to Academic and Support Staff based on the following scale (with justifications): *Poor/Satisfactory/Good		

## H CRITERION 6: FACILITIES

No.	Refer to Sections 6.6 and 7.3.7	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	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.		
2	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.		

3	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.		
4	<p>The information required in items 1 to 3 above should be provided in the supporting documents but is not limited to the following:</p> <ul style="list-style-type: none"> <li>○ A summary, in tabulated form, of the lecture facilities (give number, capacity, and audio video facilities available).</li> <li>○ A summary, in tabulated form, of the laboratories (list down the equipment available in each laboratory).</li> <li>○ A summary, in tabulated form, of the workshops (list down the equipment/machinery available in each workshop).</li> <li>○ A summary, in tabulated form, of the computer laboratories (list down the hardware and software available).</li> <li>○ 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).</li> <li>○ A summary, in tabulated form, of recreational facilities.</li> <li>○ A summary, in tabulated form, of information on recent improvements and planned improvements in these facilities.</li> </ul>		
5	Describe procedures and monitoring of health, safety and environmental aspects of facilities including lecture halls, laboratories, equipment, etc.		
6	Describe maintenance and calibration aspects of teaching facilities and equipment/apparatus.		

7	Discuss how the safety, health and environment issues being managed by the IHL.		
8	Describe CQI strategies to be implemented in relation to Facilities.		
9	Self-assess on programme performance related to Facilities based on the following scale (with justifications): *Poor/Satisfactory/Good		

### I CRITERION 7: QUALITY MANAGEMENT SYSTEMS (QMS)

No.	Refer to Sections 6.7 and 7.3.8	Indicate the location of these items in the submitted SAR	Checked by Evaluation Panel
1	Describe the Quality Management Systems and organisational structure of the IHL as well as the structure within the faculty/department/programme. Discuss the commitment and level and adequacy of institutional support, operating environment, financial resources, constructive leadership, policies and mechanisms for attracting, appointing, retaining and rewarding well-qualified staff and provision of professional development, and provision of infrastructure and support services to achieve the PEOs and POs and assure continuity/sustainability of the programme. All relevant policies are to be made available during the visit.		
2	Discuss the mechanism for the following: programme planning; curriculum development; curriculum and content review; responding to feedback and inputs from stakeholders including Industry Advisory Panel (IAP), students and alumni; tracking the contribution of individual courses to the POs; tracking outcomes of performance through assessment; responding to External Examiners comments; reviewing of PEOs and POs; and Continual		

	Quality Improvement (CQI). 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.		
3	Summarise feedback obtained from all stakeholders (External Examiner, IAP, students and alumni, etc.) and how CQI was carried out.		
4	Summarise benchmarking reports and how CQI was carried out.		
5	<p>Describe how the Quality Management System (QMS) of the IHL provides quality assurance covering (not limited to) the following:</p> <ul style="list-style-type: none"> <li>○ System for Examination Regulations including Preparation and Moderation of Examination Papers: The programme has established a working system for examination regulations including preparation and moderation of examination papers.</li> <li>○ System of Assessment for Examinations, Projects, and Industrial Training: The programme has established a working system for assessment of examinations, projects, industrial training and other forms of learning delivery. The scope of assessment is wide enough to cover the achievement of POs.</li> <li>○ System for student admission and teaching and learning: The programme has established a working system for student admission and teaching and learning.</li> </ul>		
6	Describe the management system for safety, health and environment.		
7	Describe CQI strategies to be implemented in relation to QMS.		
8	Self-assess on programme performance related to Quality Management Systems (QMS) based		

	on the following scale (with justifications): *Poor/Satisfactory/Good		
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## J SUPPORTING DOCUMENTS

To be submitted as evidences with SAR in digital format.

Ref. item	Supporting documents required	Indicate the location of these items in the digital form	Checked by evaluation panel
A1 – A14	Official publications relating to the Faculty/School/Department/Programme, undergraduate prospectus and other information accessible through website.		
B1 – B5	Programme's previous accreditation history, reports, relevant letters, and other relevant documents.		
C1	Documented evidences of publication or dissemination of vision and mission statements.		
C2	Documented evidences of publication or dissemination of PEO statements.		
C4	Documented evidences of publication of PEO elements/performance indicators, achievement criteria, and performance targets.		
C5	Sample responded questionnaires/survey forms and/or other tools used to establish/formulate/define PEO elements/performance indicators, and review the PEOs.		
C6	Sample responded questionnaires/survey forms and/or other tools used to evaluate achievement of the PEOs.		
C8	Documented evidences of how the processes and results obtained from the processes resulted in the CQI of the programme.		
C9	Documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to		



	PEOs, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.		
D1	Documented evidences of publication or dissemination of PO statements.		
D4	Documented evidences of publication or dissemination of definition of PO elements/performance indicators.		
D5	Sample responded questionnaires/survey forms and/or other tools used to establish/formulate/define PO elements/performance indicators, and review of the POs.		
D6	Documented evidences of publication or dissemination of the OBE model adopted to deliver, assess and evaluate achievement of the POs.		
D6 – D9	‘PO box/tray’ for each PO, to cover from mapping of courses to the selected POs, until the determination of the PO achievements (based the adopted model).		
D10	Documented evidences of established PO management system (computer software etc.).		
D11	Documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to POs, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.		
E3	Documented evidences of publication or dissemination of overall ‘Courses to POs’ mapping matrix.		
E5	Documented evidences of publication or dissemination of the elaboration/definition of CPS, CEA and Knowledge Profile.		
E6	List of titles of experiments in the laboratory and documented evidences showing open-ended laboratory activities.		
E7	List of industrial training companies.		
E8	List of exposure to professional practice		

	activities and sample students' reports.		
E9	List of final-year project titles.		
E10	Integrated design project's synopsis and learning outcomes and Course to Programme Outcomes matrix.		
E11	Documented evidences showing programme implementation of the 'Condition for Passing Courses'.		
E12	Provide documented evidences such as minutes of meetings, training lists and documents, workshop reports, briefing notes, reminders, relevant forms, and internal communications, instructions, etc. of the processes related to Academic Curriculum, and the involvement of various internal and external stakeholders in these processes to support claims made in this section.		
F1	Documented evidences showing the students admission requirements to the programme.		
F2	Documented evidences showing the policies and processes for credit transfer/exemption.		
F3	Documented evidences showing available students' counselling services.		
F4	Documented evidences showing formal or informal feedback platform/channel to obtain students feedback and suggestions for further programme improvement.		
F6	Documented evidences showing students' involvement in student organisations and relevant professional engineering bodies that provide experience in management and governance, representation in education and related matters, non-academic or co-curricular activities, and social activities.		
F8	Provide documented evidences showing students' performance in relation to PO from an overall holistic perspective, from both curricular and co-curricular activities, such as participating in design competition, public speaking activities, etc.		

G1	Documented evidences of staff training to ensure real understanding and implementation of OBE, as well as other training such as effective communication skills, teamwork, leadership, etc.		
G5	Documented evidences showing participation of academic staff in professional training and qualifications, and programme's projection/plan on professional training schemes for academic staff.		
G6	Documented evidences showing participation of academic staff in consultancy activities.		
G7	Documented evidences showing participation of academic staff in research and development activities.		
H5	Documented evidences of procedures and monitoring of health and safety aspects of facilities including lecture halls, laboratories, equipment, etc.		
H6	Documented evidences of maintenance and calibration of facilities and equipment/apparatus in the laboratories or elsewhere.		
I1 – I6	<p>Documented evidences of (not limited to):</p> <ul style="list-style-type: none"> <li>○ QMS and organisational structure.</li> <li>○ available policies.</li> <li>○ Standard Operating Procedures (SOP), or ISO or other certifications.</li> <li>○ relevant files (including course files) and documentations.</li> <li>○ relevant minutes of meeting (MOM) related to QMS, such as from IAP's meetings, Quality Committee meeting, etc.</li> <li>○ management system for safety, health and environment.</li> <li>○ letters of appointment of IAP, External Examiner(s), and committee members,</li> </ul>		

	<p>etc.</p> <ul style="list-style-type: none"><li>○ External Examiners' reports.</li><li>○ benchmarking report/s.</li><li>○ Provide responses to close the loop of feedback from stakeholders.</li></ul>		
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APPENDIX D

## ENGINEERING ACCREDITATION COUNCIL

## Evaluation Panel Report

Name of IHL:

Programme for Accreditation:

General Remarks

**A QUALIFYING REQUIREMENTS**

1	Outcome-based Education (OBE) implementation	YES/NO
2	Minimum 135 credits of which 90 credits must be engineering subjects (based on SLT)	YES/NO
3	Integrated design project	YES/NO
4	Final year project (minimum six (6) credits)	YES/NO
5	Industrial training (minimum of eight (8) weeks)	YES/NO
6	Full-time teaching staff (minimum of eight (8)) with at least three (3) Professional Engineers registered with the BEM or equivalent	YES/NO
7	Teaching Staff: student ratio of 1: 20 or better	YES/NO
8	External examiner's report	YES/NO

**B ASSESSMENT**

\* Delete where applicable

**ASSESSMENT CRITERIA****1 CRITERION 1: PROGRAMME EDUCATIONAL OBJECTIVES****1.1 General Observations:**

--

**2 CRITERION 2: PROGRAMME OUTCOMES****2.1 Observation on Programme Outcomes:**

--

**2.2 Observation on Processes and Results:**

--

**2.3 Observation on Stakeholder Involvement:**

--

**Overall Comments/Remarks: \*Poor/Satisfactory/Good**

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

### 3 CRITERION 3 : ACADEMIC CURRICULUM

#### 3.1 Credits

(a) Total number of credit hours

(b) Number of credit hours for engineering subjects

(c) Number of credit hours for related non-engineering subjects

#### 3.2 The Curriculum

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

(b) Programme Delivery and Assessment Methods

(c) Laboratory

(d) Integrated Design Project

(e) Final-Year Project

(f) Industrial Training

--

(g) Exposure to Professional Engineering Practice

--

**Overall Comments/Remarks:**      **\*Poor/Satisfactory/Good**

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

#### 4 CRITERION 4 : STUDENT

##### 4.1 Student Admission

(a) Entry requirements (Academic)

--

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

--

##### 4.2 Student Development

(a) Student counselling

--

(b) Workload

--



(c) Enthusiasm and motivation

--

(d) Co-curricular activities

--

(e) Observed attainment of Programme Outcomes by students

--

**Overall Comments/Remarks:** \*Poor/Satisfactory/Good

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

## 5 CRITERION 5 : TEACHING AND SUPPORT STAFF

### 5.1 Teaching Staff

(a) Number and Competency of Teaching staff

--

(b) Qualification, industrial experience & development

--

(c) Research/publication/consultancy

--

(d) Industrial involvement

(e) Teaching load/contact hours

(f) Motivation and enthusiasm

(g) Use of lecturers from industry/public bodies

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

## 5.2 Support Staff (Laboratory and Administration)

(a) Qualification and experience

(b) Adequacy of support staff

**5.3 Development of Staff**

(a) Staff development

--

(b) Staff assessment

--

(c) Academic staff: student ratio

--

**Overall Comments/Remarks: \*Poor/Satisfactory/Good**

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

**6 CRITERION 6 : FACILITIES**

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

--

(b) Laboratory/workshop - student laboratory and equipment

--

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

--

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

--

(e) Recreation facilities

--

**Overall Comments/Remarks:** \*Poor/Satisfactory/Good

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

## 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

--

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

--

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

--

### 7.2 Programme Quality Management and Planning

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

--

**7.3 External Assessment's Report and Advisory System**

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

(b) Advisory panel from industries and other relevant stakeholders

**7.4 Quality Assurance**

(a) System for student admission and teaching and learning

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

**7.5 Safety, Health and Environment**

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

**Overall Comments/Remarks:** \*Poor/Satisfactory/Good

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	

## EVALUATION PANEL ASSESSMENT REPORT SUMMARY

## Overall Comments/Remarks:

<b>Strength</b>	
<b>Weakness</b>	
<b>Concern</b>	
<b>Opportunity for Improvement</b>	
<b>Other remarks</b>	
<b>Suggested Discipline</b>	

Date of Visit:

Programme Title:

Faculty:

Full Accreditation (6 years)

Condition(s) to meet/Recommendation for further improvement

---



---

Accreditation (1 year/2 years/3 years/4 years/5 years)

Conditions to meet /Recommendation for further improvement

---



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Decline Accreditation

Comments:

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Prepared and submitted by Evaluation Panel:

(i) Head: Signature: \_\_\_\_\_

(ii) Member: Signature: \_\_\_\_\_

(iii) Member: Signature: \_\_\_\_\_

Date:



**ACTION BY ENGINEERING ACCREDITATION COUNCIL (EAC)**

**Date Received by the EAC:** \_\_\_\_\_

Comments by the EAC:

- (i) \_\_\_\_\_
- (ii) \_\_\_\_\_
- (iii) \_\_\_\_\_
- (iv) \_\_\_\_\_

**Recommendation by EAC**

Concurs with Evaluation Panel

\* Yes/No

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

(i) Full Accreditation (6 years)

Condition(s) to meet/Recommendation for further improvement

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(ii) Accreditation (1 year/2 years/3 years/4 years/5 years)



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(iii) Decline Accreditation

Reasons

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(iv) Condition(s) to meet

Reasons

---

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**ACTION BY SECRETARIAT**

(i) Date of Transmission of decision to BEM

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(ii) Date of Transmission of decision to MQA

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(iii) Date of Transmission of decision to JPA

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(iv) Date of Issue of Accreditation Certificate

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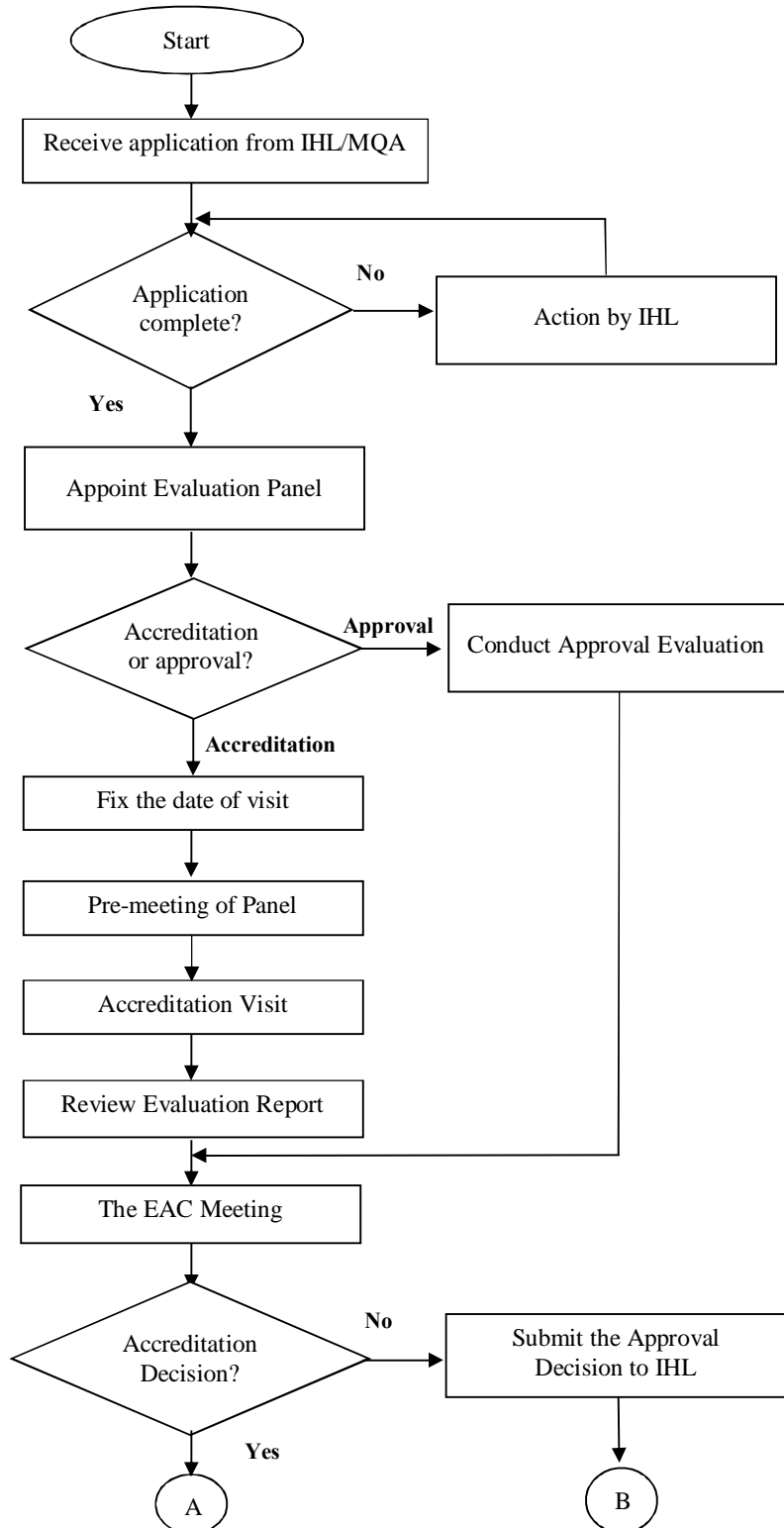
**APPENDIX E****EXTERNAL EXAMINER'S REPORT**

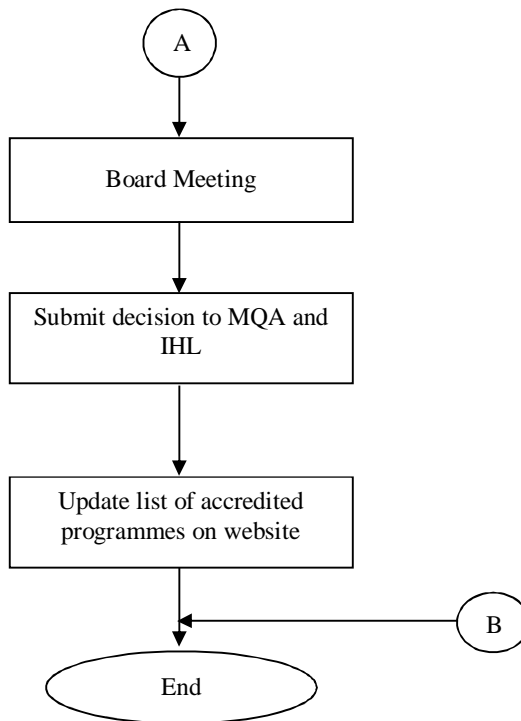
The external examiner's report shall contain but is not limited to the following:

- (i) Assessment of programme curriculum.
- (ii) Assessment of OBE implementation and achievement of the POs by the students.
- (iii) Assessment of staff quality including qualifications and industry exposure. This is to include assessment of loading of each staff in teaching, research, consultancy and supervision of student projects.
- (iv) Assessment of staff-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 examination procedures and regulations.
- (x) Management commitment towards the programme.
- (xi) Assessment of assessments moderation process.

## APPENDIX F

## PROCESS FLOW CHART FOR APPLICATION OF ACCREDITATION AND APPROVAL OF ENGINEERING PROGRAMMES





**APPENDIX G****TABLE 1 Course to PO Matrix (SAMPLE)**

Code	Course	Core/ Elective	Programme Outcomes											
			1	2	3	4	5	6	7	8	9	10	11	12
XX1A	Subject 1	Core	/											
XX1B	Subject 2	Core	/											
XX1C	Subject 3	Core	/	/										
XX1D	Subject 4	Core	/		/			/						
XX1E	Subject 5	Core						/		/				
XX1F	Subject 6	Core	/								/			
XX1G	Subject 7	Core	/	/										
XX1H	Subject 8	Core	/											
XX1I	Subject 9	Core		/		/								
XX1J	Subject 10	Core		/	/			/			/	/		/
XX2A	Subject 1	Core									/	/		/
XX2B	Subject 2	Core		/		/								
XX2C	Subject 3	Core	/										/	
XX2D	Subject 4	Core							/	/				/
XX2E	Subject 5	Core		/	/			/			/	/		/
XX2F	Subject 6	Core		/	/	/	/	/			/		/	
XX2G	Subject 7	Elective	/										/	
XX2H	Subject 8	Elective							/	/				/
XX2I	Subject 9	Elective	/			/								
XX2J	Subject 10	Elective			/			/	/					
XX2A	Subject 11	Elective		/		/								

**TABLE 2** Distribution of Engineering Courses for an Engineering Programme  
(SAMPLE)

Groupings	Course Code	Course	Course Type	Student Learning Time							Credits
				Guided Learning					Self-learning	Others Eg: assessment	
				Lecture	Lab/ Workshop	Project	PBL/ Design	Tutorial			
Broad Area 1	XXXX	Subject 1	Core	28	28	-	-	-	xxx	3	
	XXXY	Subject 2	Core	28	-	-	-	28		3	
	XXXZ	Subject 3	Core	28	-	28	-	-		3	
Broad Area 2	YYYY	Subject 4	Core	42						3	
	YYXX	Subject 5	Core	14	28	-	28	-		3	
	YYYZ	Subject 6	Core								
Broad Area 3	etc.	etc.									
Broad Area 4											
Elective Courses	FGHI	Elective I	Elective								
	HIJK	Elective II	Elective								
	IJKL	Elective III	Elective								
<b>Total Credits</b>											
Industrial Training	ABCD	Industrial Training	Core	10 Weeks							5 credits
Final Year Project	BCDE	Project I	Core	Thesis							
	DEFG	Project II	Core	Thesis							
<b>TOTAL CREDITS FOR ENGINEERING COURSES</b>											

**TABLE 3** List of Elective Courses according to Areas of Field of Specialisation (if applicable)

AREAS	CODE	ELECTIVE COURSES
Broad Area 1		
Broad Area 2		
Broad Area 3		
Broad Area 4		
Broad Area 5		



TABLE 4 Distribution of General Education Courses for an Engineering Programme (SAMPLE)

Areas (EAC)	Code	Course	Course Type	Student Learning Time						Credits
				Guided Learning				Self-learning	Others Eg: assessment	
				Lecture	Lab/Workshop/ Project	Tutorial	Others			
Applied Science/ Maths/Computer	XXXX	Subject 1	Core	42		14	xxx		xxx	
	XXXY	Subject 2	Core	28	28				xxx	
	XXXZ	Subject 3	Core	42		6			xxx	
	<b>TOTAL CREDITS</b>									<b>xxx</b>
Management/Law/ Accountancy	XXXX	Subject 1	Core	42						
	XXXY	Subject 2	Core	42						
	<b>TOTAL CREDITS</b>									<b>xxx</b>
Communication Skills/Humanities/ Ethics	XXXV	Subject 1	Core	35		14				
	XXXW	Subject 2	Core	42						
	XXXX	Subject 3	Core	28						
	XXXY	Subject 4	Core	28						
	XXXZ	Subject 5	Core	42						
<b>TOTAL CREDITS</b>									<b>xxx</b>	
Co-Curriculum	H	Co-Curriculum 1	Core	14						
	H	Co-Curriculum 2	Core	14						
	<b>TOTAL CREDITS</b>									<b>xxx</b>
<b>TOTAL CREDITS FOR GENERAL EDUCATION COURSES</b>									<b>xxx</b>	

TABLE 5 Courses Offered (Programme Structure) According to Semester and Total Credits (SAMPLE)

Semester	Code	Courses	Course Type	Credits	
				Engineering Courses	Non Engineering Courses
1	XXXA	Subject 1	Core		1
	XXXB	Subject 2	Core	3	
	XXXC	Subject 3	Core	3	
	XXXD	Subject 4	Core		3
	XXXE	Subject 5	Core		3
II	XXXV	Subject 1	Core	3	
	XXXW	Subject 2	Core		3
	XXXX	Subject 3	Core	3	
	XXXY	Subject 4	Core		3
	XXXZ	Subject 5	Core		3
INTER SESSION	etc.	etc.	Core		
III					
IV					
V					
VI					
INTER SESSION					
VII					
VIII					
<b>TOTAL CREDITS</b>					
<b>TOTAL CREDITS</b>					

TABLE 6 Distribution of Student Enrolment for all Academic Years for the Past Four (4) Years

<u>YEAR</u>	YEAR			
	Current academic year - 3	Current academic year - 2	Current academic year - 1	Current academic year
1 <sup>st</sup> Year				
2 <sup>nd</sup> Year				
3 <sup>rd</sup> Year				
4 <sup>th</sup> Year				
<b>Total No. of Students Per Year</b>				

TABLE 7 Entry Qualification of Final Year Students of the Current Year

ENTRY QUALIFICATIONS	NUMBER
STPM	
Matriculation	
Foundation	
A-Level	
Diploma	
Others (Please Specify)	
<b>TOTAL</b>	

**TABLE 8 Breakdown in Terms of Numbers of Academic Staff (Fulltime, Part-Time and Interprogramme) by Year for all Academic Years for the Past Four (4) Years**

ACADEMIC STAFF	YEAR			
	Current academic year - 3	Current academic year - 2	Current academic year - 1	Current academic year
(a) Total number of full-time staff (including those servicing other programmes, staff on study or sabbatical leave)				
(b) Full-time equivalent of academic staff servicing other programmes				
(c) Academic staff (on study or sabbatical leave)				
(d) Effective full-time academic staff = (a)-(b)-(c)				
(e) Full-time equivalent of academic staff from other programmes servicing this programme				
(f) Full-time equivalent of part time academic staff				
<b>Full-Time Equivalent Academic Staff (FTES) Contributing to Staff: Student Ratio = (d)+(e)+(f)</b>				

Notes :

If an academic 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 10 Academic Qualifications of Academic Staff

Academic Qualifications	Number
Doctorate	
Masters	
Bachelor	
<b>TOTAL</b>	

TABLE 11 Professional Qualifications and Membership in Professional Bodies/Learned Societies of Academic Staff

Type of Qualification/Field	Number
Graduate Engineer BEM	
PEng	
CEng	
CPEng	
FIEM	
MIEM	
Graduate Member IEM	
IEAust	
Others (please specify)	

TABLE 12 Post Held by Academic Staff

Post	Number	
	Full Time	Part Time
Professor		
Assoc. Professor		
Assistant Professor		
Senior Lecturer		
Lecturer		
Others (please specify)		
<b>TOTAL</b>		

**TABLE 13 Academic Staff Teaching Workload Summary for the Current Semester**

Staff Member (Name)	Part or Full Time or From Other Programmes	Courses Taught (Course Code/Credits*)



**TABLE 14 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 15 Post Held by Support Staff

Post	Number
<b>TOTAL</b>	

TABLE 16 Staff: Student Ratio

SESSION	Current academic year - 3	Current academic year - 2	Current academic year - 1	Current academic year
<b>RATIO</b>				

## GUIDELINES FOR EVALUATION PANEL

### 1. INTRODUCTION

This Appendix serves as a guide to all Evaluation Panel members who are appointed by the EAC, 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 developed based on the IEM Accreditation Handbook for Engineering Degrees: Volumes 1 & 2 and *Buku Penilaian Kursus Pengajian IPTS* and *LAN*, and improved further based on feedback from Washington Accord Mentors and relevant stakeholders, IHLs and industry.

### 2. PREPARATION FOR ACCREDITATION VISIT

The Evaluation Panel needs to be aware of the EAC policies on accreditation as detailed in Section 5 of this Manual.

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

The Evaluation Panel will assess the Programme Objectives and Outcomes as well as carry out an evaluation based on all the accreditation Criteria 1 to 5 set forth in Section 7 of this Manual. 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 EAD.

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 EAC.

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 EAD 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 EAC.

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)

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 EAC evaluation criteria and how they apply to the programme being evaluated.

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

- Programme 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 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 internship and project work are at a sufficient level
- Students' standing in terms of their admission standards, academic performance, and industrial internship
- The academic 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 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

8.30 – 9.00	Evaluation Panel Meeting (Private Session)
9.00 – 9.10	Evaluation Panel briefing to the IHL
9.10 – 9.30	IHL (Vice Chancellor/Rector/Dean/Head) briefing to the Evaluation Panel

9.30 – 10.30	Meetings with Programme head(s) and leadership team to discuss curriculum design and quality system (includes morning tea)
10.30 – 12.00	Meeting with academic staff (schedule to be established the evening before)
12.00 – 2.00	Evaluation Panel Meeting (Private Session) to review displayed documents (includes a light working lunch)
2.00 – 3.00	Evaluation Panel Visit to supporting units and facilities
3.00 – 4.00	Meeting with students
4.00 – 5.00	Meeting with external stakeholders (employers, alumni, industry advisors/programme advisors) (includes light refreshments)
5.00	Return to hotel
8.30 – 10.30	Evaluation Panel Working Dinner (Private Session)

#### Accreditation Visit: Day 2

8.30 – 10.00	Evaluation Panel Tour of engineering laboratories and associated facilities
10.00 – 11.00	Evaluation Panel Review of examinations, course materials and student work (includes morning tea)
11.00 – 12.00	Evaluation Panel Meeting with technical/administrative staff (additional meeting with academic staff and/or students may also be arranged)
12.00 – 2.00	Evaluation Panel Meeting (Private Session) (includes a light working lunch)
2.00 – 3.00	Evaluation Panel review of quality assurance system and outcome based assessment processes
3.00 – 4.30	Evaluation Panel Meeting (Private Session) to revise draft report (includes light refreshment)

4.30 – 5.00	Exit meeting with IHL Senior leadership team
8.30 – 10.30	Evaluation Panel Working Dinner (Private Session to prepare draft report)

Throughout the discussions with the administrators, academic 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 C (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). 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 EAC 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 EAC.

The Evaluation Panel report should be forwarded to EAC no later than 4 weeks after the visit.

For full accreditation, there should not be any weakness for each criterion (Section 6.1 to 6.7) 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. Outcome-based Education (OBE) implementation.
2. A minimum of 135 credits\* of which 90 credits\* must be engineering courses offered over a period of four years.
3. Integrated design project.
4. Final year project.
5. Industrial training
6. Full-time academic staff (minimum of eight(8)) with at least three (3) Professional Engineers registered with the BEM or equivalent.
7. Teaching Staff : student ratio of 1:20 or better.
8. External examiner's report.

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



**ASSESSMENT AND EVALUATION**

The following guide shall be used by the Evaluation Panel to assess Criteria 1 – 7:

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**CRITERION 1 – PROGRAMME OBJECTIVES**


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**MANUAL  
REFERENCE****GUIDE FOR EVALUATION****Section 6.1  
Programme  
Educational  
Objectives**

An engineering programme seeking accreditation shall have published Programme Educational Objectives (PEOs) that are consistent with the mission and vision of the IHL, and are responsive to the expressed interest of various groups of programme stakeholders. The PEOs must be considered in the design and review of curriculum in a top down approach.

The following are examples of **performance indicators** expected for **Programme Objectives**:

- Defined, measurable and achievable
- Linked to Programme Outcomes
- Have own niche
- Published and publicised
- Consistent and linked to mission & vision of IHLs and stakeholder needs
- Linked to curriculum design
- Reviewed and updated
- Established process for assessing and evaluating achievement of PEOs
- Evaluation results are used in CQI of the programme
- High degree of stakeholder involvement in the process

The process of establishing the educational objectives should be evaluated by the Evaluation Panel by examining the evidence provided by the programme. The following guidelines are recommended for evaluation:

**Performance Level****Indicative Guide****Poor**

Fails to address the performance indicators

**Satisfactory**

Addresses most of the performance indicators

**Good**

Addresses all or more of the performance indicators

## CRITERION 2 - PROGRAMME OUTCOMES

MANUAL  
REFERENCE

## GUIDE FOR EVALUATION

**Section 6.2  
Programme  
Outcomes**

An engineering programme seeking accreditation must have published Programme Outcomes that have been formulated considering items (i) to (xii) given in Section 6.2 of the Manual, and/or any added outcomes by the programme that can contribute to the achievement of its stated Programme Objectives. The Programme Outcomes must be shown to be linked to the Programme Objectives.

The following **performance indicators are** expected for **Programme Outcomes**:

- Covers (i) to (xii)
- Linked to Programme Objectives
- Defined, measurable and achievable
- Detailed out and documented
- Published
- Consistent and tied to Programme Objectives
- Outcomes in line with national needs
- Reviewed and updated

Evaluation shall be based on the following:

**Performance Level****Indicative Guide****Poor**

Fails to address the performance indicators

**Satisfactory**

Addresses most of the performance indicators

**Good**

Addresses all or more of the performance indicators

## CRITERION 2 - PROGRAMME OUTCOMES

MANUAL  
REFERENCE

## GUIDE FOR EVALUATION

**Section 6.2  
Processes  
and Results**

The programme shall also establish a process of measuring, assessing and evaluating the degree of achievement of Programme Outcomes by the students. The results of this assessment process shall be applied for continual improvement of the programme.

The following **performance indicators** are expected for **Processes and Results**:

- Processes for all elements of criteria are quantitatively/qualitatively understood and controlled
- Processes are clearly linked to mission, Programme Objectives, and stakeholder needs
- Systematic evaluation and process improvement in place
- CQI involved support areas
- Processes are deployed throughout the programme, faculty, and IHLs
- Sound and highly integrated system
- Common sources of problems understood and eliminated
- Sustained results
- Results clearly caused by systematic approach

Evaluation shall be based on the following:

**Performance Level****Indicative Guide****Poor**

Fails to address the performance indicators

**Satisfactory**

Addresses most of the performance indicators

**Good**

Addresses all or more of the performance indicators

## CRITERION 2 - PROGRAMME OUTCOMES

MANUAL REFERENCE	GUIDE FOR EVALUATION
<b>Section 6.2 Stakeholder Involvement</b>	<p>The IHL shall produce evidence of stakeholder involvement in the programme with regard to <b>Section 6.2</b> of the Manual.</p> <p>The following <b>performance indicators</b> are expected for <b>Stakeholders Involvement</b>:</p> <ul style="list-style-type: none"> <li>• High degree of involvement in defining Programme Outcomes statements</li> <li>• High degree of involvement in assessing the achievement of Programme Outcomes</li> <li>• High degree of involvement in assessing improvement cycles (CQI)</li> <li>• Involved in strategic partnership</li> </ul> <p>The involvement of stakeholders should be of prime importance for the programme. The Evaluation Panel shall examine the relationship established between the programme and the intended stakeholders. Evaluation shall be based on the following:</p> <p style="text-align: center;"><b>Performance Level</b></p> <p><b>Indicative Guide</b></p> <p><b>Poor</b> Fails to address the performance indicators</p> <p><b>Satisfactory</b> Addresses most of the performance indicators</p> <p><b>Good</b> Addresses all or more of the performance indicators</p>

\* Please refer to Table PO-1 for further explanation on evidence etc.

Table PO-1 Explanation on the possible evidences acceptable for evaluation

Required Features of Programme Outcomes	Possible Evidence	Generally not acceptable	Comments
<b>Demonstration of Student Outcomes</b>	<p><b><i>Evidence must be directly linked to the specific outcome being assessed.</i></b> A limited set of performance indicators have been developed that define each of the outcomes to be assessed. Data collection methods are focused on the indicators and can include such things as: student portfolios; subject content examinations; performance evaluation of work/study, intern or co-ops; and/or performance observations. Surveys and other indirect measures provide secondary evidence and should be used in conjunction with direct measures such as those above.</p>	<p>Student learning outcomes that have not been defined (e.g., What is “effective communication skills?” How will you know “effective communication skills” when you see it?) Student self-assessments and surveys are used as the only evidence of student outcomes. Using course mapping as an indicator of student learning.</p>	<p>Students do not possess a long-term, objective, calibrated perspective on their performance level that the faculty does. Therefore, student opinion surveys are a weak method for demonstrating achievement of outcomes. Using course mapping to document student learning only documents what is “taught” not what is learned.</p>
<b>Outcomes Linked to the Curriculum</b>	<p>Mapping of outcomes to the curriculum or associated programme activities (student professional groups); course syllabi that indicate the desired programme learning outcomes that are</p>	<p>Making the assumption that students achieve all outcomes by merely completing the curriculum.</p>	<p>The educational experience to achieve the targeted programme outcomes should be guaranteed to all students; it is not necessary that</p>

	'covered' in the course.		all outcomes have the same emphasis in all programmes.
<b>Assessment Process</b>	<p>Schematic drawing of the assessment process with a timeline that reflects systematic processes.</p> <p>Documentation of how the process is being sustained and what multiple assessment methods are being used to assess the various outcomes.</p>	<p>Collecting information that is not used to evaluate outcomes.;</p> <p>inappropriate use of assessment methods;</p> <p>no direct measures of student learning, overuse of surveys;</p> <p>data collection is irregular; inefficient process;</p> <p>inordinate faculty programme assessment load;</p> <p>faculty not involved in the decision making process.</p>	<p>Every outcome does not need to be assessed yearly; assessment cycles should meet programme needs for information, but must be systematic.</p> <p>Systematic timeline for data collection should be evident.</p> <p>Process coordinator is desirable.</p>
<b>With Documented Results</b>	<p>Summary of results are available that reflects evidence of systematic outcomes assessment. Summaries, evaluation of results and action taken is presented outcome by outcome.</p>	<p>Documentation that does not focus directly on the process; presentation of raw data or charts of raw data instead of brief summaries of findings and action taken (i.e., "data dump").</p>	<p>Documentation of results with evaluation is important to this process. Generally, a lot of raw data or tables of results with no summaries generally reflect inadequate evaluation processes.</p>
<b>Results Applied for Programme Improvement</b>	<p>Data must be evaluated by the faculty or a group of faculty members and recommendations for action documented. For those IHLs that have had multiple cycles of assessment, documentation should reflect the results of</p>	<p><i>Ad hoc</i> consideration of programme improvement;</p> <p>"traditional" course evaluations &amp; student "satisfaction" surveys used as basis for improvements.</p> <p>Failure to document</p>	

	previous improvements.	how the changes that are made relate to the evaluation of the assessment data.	
<b>Measurement of Outcomes</b>	Outcomes are measurable, in that there are performance indicators for each outcome, which enable direct measurement.	Faculty not involved in decisions about assessment; assessment is done by external parties; use of methods that do not align with programme's own definition of its outcomes.	Course grades do not constitute measurement of outcomes. Surveys allow <i>measurement</i> , but are not directly focused on student work.
<b>Outcomes Related to Programme Objectives</b>	Clear linkages between the "after graduation" programme objectives and student learning outcomes.	No clear distinction between objectives and outcomes. Terms are used interchangeably throughout the document, and it is not clear that a distinction has been made between how they are assessed and evaluated.	It is important to note that the terms "outcomes" and "objectives" are not standardised. Some programmes may use other terms to describe the same processes. It is important to understand the terms being used by each programme.

#### DIRECT ASSESSMENTS

Direct assessments assess student performance of identified learning outcomes through assessment tools such as exams, tests, quizzes, projects, presentations, simulations, interviews, team working, etc.

#### INDIRECT ASSESSMENTS

Indirect assessments assess opinions or thoughts about student's knowledge, skills, attitudes, learning experiences, and perceptions, such as student surveys about instruction; focus group; alumni surveys; employer surveys, etc.

## CRITERION 3 - ACADEMIC CURRICULUM

## Aspects

## Guide for Evaluation

Unless stated otherwise, the evaluation should follow this scale:

	Poor	Satisfactory	Good
Addressing:	Not at all		Yes a lot

**Programme  
Structure and  
Course  
Contents, and  
Balanced  
Curriculum**

The academic curriculum and curricular design shall strongly reflect the philosophy and approach adopted in the programme structure. The programme structure shall be appropriate to, consistent with, and shall support the attainment or achievement of the Programme Outcomes.

Emphasis on the curriculum shall be placed on the understanding and acquisition of basic principles and skills of a discipline, rather than memorisation of facts and details. 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 and other Programme Outcomes listed by the programme. Co-curriculum activities must be designed to enrich student experiences, foster personal development and prepare them for responsible leadership. For each course, the title shall be suitable and the pre-requisites shall be mentioned, and appropriate in terms of content.

The course content and core materials etc. shall cover each component specified in **Appendix B** to an appropriate breadth and depth, and shall be adequate and relevant to the Programme Outcomes. The curriculum shall encompass the complex problem solving, complex engineering activities and knowledge profile as summarised in the same appendix. Adequate time shall be allocated for each component of the content/course, including the elective courses. The sequence of contents shall be appropriate and updated to keep up with the scientific, technological and knowledge development in the field, and to meet the needs of society. There shall be 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.

The curriculum content shall cover:

- mathematical techniques, technical subjects, co-curriculum subjects and technical communication subjects;



- technical proficiency in a major field of engineering, including the ability to tackle a wide variety of practical problems;
- a professional attitude towards matters such as design reliability and maintenance, product quality and value, marketing and safety;
- skills in oral and written communication; and
- appropriate exposure to professionalism, codes of ethics, safety and environmental considerations.

The curriculum shall be balanced and includes all technical and non-technical attributes listed in the Programme Outcomes. Electives are encouraged, monitored, and appraised. The proportion of electives shall not exceed the core subjects and shall preferably offer wide options. The curriculum integrates theory with practice through adequate exposure to laboratory work and professional engineering practice.

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**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, 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.

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.

The Evaluation panel is to find out from staff members and students the opportunities provided for interaction and group learning. Tutorials must be supervised and attendance made compulsory. Sufficient contact hours must be allocated for consultation and interaction between staff members and students. Staff members can be full time academic staff members at the remote campuses, or qualified Engineers from the industry.

Tutorials, group learning, interaction and innovative educational experience are designed to complement lectures. Tutorial and all other delivery approaches are 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.

The Evaluation Panel shall ascertain if the continuous assessment components demonstrate the depth of knowledge that satisfies the condition for passing courses.

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**Laboratory**

Laboratory reports shall be checked by the Evaluation Panel.

The assessment of laboratory reports shall have been done through a systematic manner. There must be proper laboratory supervision by academic staff members or qualified Engineers from the industry. Students shall receive sufficient laboratory work to complement engineering theory that is learnt through lectures. The laboratory should help students develop competence in executing experimental work. Students need to work in groups, not exceeding five (5) in a group. The laboratory works shall involve open-ended exercises.

Laboratory exercises shall be relevant and adequate, illustrative, and promote development of instrumentation skills. Inspection of reports needs to show that the required outcomes have been achieved.

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**Final Year Project**

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. 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 academic 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 tools in some aspect of the work, emphasising the need for engineers to make use of computers and multimedia technology in everyday practice.

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<b>Integrated Design Project</b>	<p>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 ascertained. 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 facilitator/coordinator of the Projects must be qualified academic staff with relevant experience. The projects must be supported with relevant resources and facilities.</p> <p>Integrated Design Projects shall involve complex problem solving and complex engineering activities which include design systems, components or processes integrating (culminating) core areas; and meeting specific needs with appropriate consideration for public health and safety, cultural, societal, project management, economy, and environmental considerations where appropriate. The design project should involve students working in group. The programme may take the opportunity to assess many relevant programme outcomes through the design project.</p>
<b>Industrial Training</b>	<p>Exposure to professional engineering practice in the form of an industrial training scheme is compulsory for minimum of eight (8) weeks continuously. The industrial training is shown to have exposed students and to have made them familiar with relevant engineering practices. Students should be placed in relevant organization and undergo structured training supervised by qualified person. The IHL shall put in place a system to monitor and assess the industrial training. 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).</p>
<b>Exposure to Professional Practice</b>	<p>Exposure to engineering practice is integrated throughout the curriculum. It has been obtained through a combination of the following:</p> <ul style="list-style-type: none"><li>(a) Lectures/talks by guest lecturers from industry</li><li>(b) Academic staff with industrial experience</li><li>(c) Courses on professional ethics and code of conduct</li><li>(d) Industry visits</li><li>(e) Industry-based project</li><li>(f) Regular use of a logbook in which industrial experiences are recorded</li></ul>

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## CRITERION 4: STUDENTS

Aspects	Guide for Evaluation		
<b>Unless stated otherwise, the evaluation should follow this scale:</b>			
	Poor	Satisfactory	Good
Addressing:	Not at all		Yes a lot
<b>Entry Requirements (Academic)</b>	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 engineer.		
<b>Transfer Policy/Selection Procedures/Appropriateness of Arrangements for Exemptions from Part of the Course/Transfer Policy</b>	The IHL shall develop a clear, documented and enforced policy on admission and transfer of students. The policy shall take into account the different backgrounds of students in order to allow alternative educational pathways. The exemptions of credit hours shall be based on justifiable grounds. A maximum Credit or Course Exemption of 30% of the total programme credits is allowed for accredited/recognized Diploma to Bachelor degree; and a maximum Credit Transfer of 50% of the total programme credits is allowed between accredited/recognised from Bachelor to Bachelor degree.		
<b>Student Counselling</b>	IHLs shall provide counselling services to students regarding academic and career matters, as well as provide assistance in handling health, financial, stress, emotional and spiritual problems.		
<b>Workload</b>	Students shall not be over-burdened with workload that may be beyond their ability to cope with.		
	Average Credits* per 14-week semester:		
	21 or more	18 - 20	17 or less
	Poor	Satisfactory	Good
<b>Enthusiasm and Motivation</b>	The teaching-learning environment shall be conducive to ensure that students are always enthusiastic and motivated.		

<b>Co-Curricular Activities</b>	IHLs shall also actively encourage student participation in co-curricular activities and student organisations that provide experience in management and governance, representation in education, competitions and related matters and social activities.
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<b>Observed Attainment of the Programme Outcomes by the Students</b>	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 to triangulate various aspects of the attainment.
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### CRITERION 5 - ACADEMIC AND SUPPORT STAFF

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Aspects	Guide for Evaluation
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Unless stated otherwise, the evaluation should follow this scale:

	Poor	Satisfactory	Good
Addressing:	Not at all		Yes a lot

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#### ACADEMIC STAFF

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<b>Adequacy of Academic Staff</b>	There must be at least <b>8 full-time</b> staff members whose first degree must be in engineering and relevant to the discipline. The staff shall be sufficient in number and competencies to cover all curricular areas.
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<b>Academic Qualification</b>	At least 60% of the staff members are full-timers, with the majority having PhDs in appropriate areas.
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<b>Professional Qualification</b>	Each programme shall have at least three (3) full-time Professional Engineers registered with the Board of Engineers Malaysia or equivalent at all times and actively engaged in the programme.  Staff Members are also encouraged to attain other Professional qualifications and be active
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<b>Research/ Publication</b>	Academic 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.
<b>Industrial Involvement/ Consultancy</b>	The Evaluation Panel is to assess whether the staff members are involved in appropriate consultancy, collaborations, advisory and engagements with the industry and relevant organisations.
<b>Teaching Load</b>	Average teaching load (teaching hours per week): < 12 hours (good), 12 – 15 (satisfactory), >15 (poor). The Evaluation Panel shall triangulate the teaching load assessment with the academic staff during the interview.
<b>Motivation and Enthusiasm</b>	The Evaluation Panel is to have a separate meeting with faculty staff members to assess their motivation and enthusiasm.
<b>Use of Lecturers from Industry/Public Bodies</b>	The Faculty is encouraged to invite engineers from industry and professional bodies to deliver seminars/lectures/talks to students.
<b>Awareness of the Outcome- Based Approach to Education</b>	The Evaluation Panel is to assess staff ability to implement the Outcome-Based approach to education.

#### SUPPORT STAFF

<b>Qualifications</b>	Certificates, diplomas and degrees in the relevant areas:  ≥80% of staff (Good)  60-80 (Satisfactory)  < 60 (Poor)
<b>Adequacy of Support Staff</b>	1 Laboratory Staff Member to 1 Laboratory: Good  1 Laboratory Staff Member to 2 Laboratories: Satisfactory  The Evaluation Panel may use his/her discretion when a large laboratory/workshop is evaluated.

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**DEVELOPMENT OF STAFF**


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<b>Staff Development</b>	<p>The IHL shall systematically plan and provide appropriate training, sponsorship for postgraduate studies/ sponsorship for conferences, sabbatical leave etc. for academic staff.</p> <p>Similarly for support staff, the IHL shall provide the opportunities for them to upgrade their competencies through training and practical exposure.</p>						
<b>Staff Assessment</b>	<p>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.</p> <p>Similarly, the IHL shall also establish a working system for evaluation/feedback by students on matters relevant to their academic environment.</p>						
<b>Staff : Student Ratio</b>	<p>The Evaluation Panel shall evaluate the ratio of academic staff: student for the programme for the last four (4) academic sessions. The following guide shall be used for evaluation.</p> <table style="width: 100%; text-align: center;"> <tr> <td>Poorer than 1:20</td> <td>1:20 or better – poorer than 1:15</td> <td>1:15 or better</td> </tr> <tr> <td>Poor</td> <td>Satisfactory</td> <td>Good</td> </tr> </table>	Poorer than 1:20	1:20 or better – poorer than 1:15	1:15 or better	Poor	Satisfactory	Good
Poorer than 1:20	1:20 or better – poorer than 1:15	1:15 or better					
Poor	Satisfactory	Good					

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**CRITERION 6: FACILITIES**


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<b>Aspects</b>	<b>Guide for Evaluation</b>
	<p>Facilities in terms of lecture rooms, laboratory facilities, library/resource centre, eateries and general facilities should be available and accessible to the students.</p> <p>In the case of off-campus/distance-learning mode, the Evaluation Panel should comment on whether the facilities are equivalent to those provided for the on-campus students. In the case where the students are sent to the main campus to complete the experiments over a short period of time rather than being spread out (as in the case of the main campus), the Evaluation Panel should comment on the effectiveness of such a practice in the report after interviewing the students.</p>

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<b>Lecture Rooms - Quantity Provided and Quality of A/V</b>	(a) Lecture Rooms – Quantity and Quality (in terms of furniture, environment and AV Equipment)	Poor	Satisfactory	Good
		Inadequate	Moderately Adequate	Adequate
<b>Laboratory / Workshop - Student Laboratory and Equipment</b>	Laboratory/Workshop – Laboratory facilities should be examined to ensure there are sufficient facilities and equipment to cater for the students.	Average Student Number per Laboratory Experiment is:		
		6 or more (Poor)	4-5 (Satisfactory)	3 or less (Good)
<b>IT/Computer Laboratory - Adequacy of Software</b>	IT/Computer Laboratory	Average Number of Students per Computer: A minimum of 10:1		
		Greater than 6 (Poor)	4-5 (Satisfactory)	3 or less (Good)
<b>Library / Resource Centre - Quantity of Books Provided</b>	The IHL is to have sufficient, relevant and recent titles of online/hardcopies 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.		
		Not available/Not accessible Poor	Available/Accessible Satisfactory	Available and accessible Good



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**CRITERION 7: QUALITY MANAGEMENT SYSTEMS**


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**Aspects****Guide for Evaluation**

**Unless stated otherwise, the evaluation should follow this scale:**

Poor Inadequate	Satisfactory Moderately Adequate	Good Adequate
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**Institutional Support, Operating Environment, and Financial Resources**

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**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.

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**Attract and Retain a 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.

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**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.

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**Programme Quality Management and Planning**

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**System for Programme Planning, Curriculum Development, and Regular Curriculum and Content**

The Evaluation Panel should assess the overall CQI process being used in the programme. 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 used in the IHL can be highlighted. 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 assess the effectiveness of such a system towards improvement of overall programme delivery.

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### External Assessment and Advisory System

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<b>External Examiners and how these are being used for Quality Improvement</b>	<p>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.</p> <p>External examiner's evaluation is to be made at least once in every two (2) years and the report shall comply to Appendix E of EAC Manual 2017.</p>
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<b>Industry Advisory Panel and other Relevant Stakeholders</b>	<p>The programme shall have an Industry Advisory Panel (IAP) with members officially appointed with specific Terms of Reference (TOR) and period from industry and/or other relevant stakeholders. The programme shall provide evidence of meetings and dialogues with the IAP and the extent of their involvement in terms of quality improvement.</p> <p>IAP meeting shall be conducted at least once a year and properly documented.</p>
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### Quality Assurance

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<b>System for Examination Regulations including Preparation and Moderation of Examination Papers</b>	<p>The IHL shall establish a working system for examination regulations including preparation and moderation of examination papers.</p>
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<b>System of Assessment for Examinations, Projects, Industrial Training</b>	<p>The IHL shall establish a working system for assessment of examinations, projects, industrial training and other assessments. The scope and tools of assessment shall be coherent to measure the achievement of programme outcomes.</p>
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**Safety, Health and Environment**

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**System for  
managing and  
implementatio  
n of safety,  
health and  
environment**

The IHL shall demonstrate that it has put in place a policy, system and resources for managing and implementation of safety, health and environment.

The safety, health and environment culture must be apparent among staff and students.

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### DISTANCE LEARNING/ OFF-CAMPUS PROGRAMMES

The quality of the environment in which the programme is delivered is regarded as paramount in providing the educational experience necessary for engendering independence of thought of its graduates.

There must be adequate classrooms, learning support facilities, study areas, information resources (resource centres or libraries), computing and information technology systems, and general infrastructure to meet the programme's objectives. These facilities must enable students to learn the use of modern engineering, organisational and presentation tools, and explore beyond the formal dictates of their specific programme of study.

For programmes offered wholly or partly in distance mode or at multiple or remote locations, communication facilities must be sufficient to provide students with the learning experience and support equivalent to on-campus attendance. There must also be adequate facilities for student-student and student-staff interactions.

Laboratories and workshops should be adequately equipped for experiments and "hands-on" experience in the areas of engineering subjects. Adequate experimental facilities must be available for students to gain substantial understanding and experience in operating engineering equipment and of designing and conducting experiments. The equipment must be reasonably representative of modern engineering practice. Where practical work is undertaken at another IHL, or in industry, arrangements must be such as to provide reasonable accessibility and opportunity for learning, as well as supervision and monitoring by the teaching staff.

In assessing the non-traditional mode of delivery, it is proposed that the Evaluation Panel should give a report that compares the system of the parent IHLs (or main campus) and the system in each of the remote locations or branch campuses or distance-learning modes. Assuming the syllabus and examination questions are the same, the following areas need to be addressed in detail (a table of comparisons between the main campus and the remote location/distance-learning mode will be useful):

(a) Teaching Staff

- Percentage of the part-time staff and their workload
- Number of supporting academic staff members for tutorials or interaction with off-campus or distance learning or remote location students
- Percentage of the staff from main campus and their workload

(b) Student

- Entry requirement
- Selection procedures
- Student counselling

- Exposure to Industry
- Enthusiasm and motivation
- Workload
- Interaction with other students
- Interaction with teaching staff

(c) Facilities available at the Remote Location

- Lecture rooms and AV facilities
- Laboratory/workshop
- IT/computer and adequacy of software
- Library resources
- Recreation facilities

(d) Quality Control

- Assessment of coursework
- Final Examination and grading
- Moderation or Quality Assurance Process by the main campus

Evaluation Panel visit is required for each remote location (preferably by the same Evaluation Panel that assesses the degree programme at the main campus).