EAC MANUAL 2012 – Best Practices on Accreditation

Presenter

SITI HAWA HAMZAH
PhD, P. Eng, FIEM, Assoc. Member ASM, Hon MAFEO ASEAN Engr, MPWI, MRM, PSWM
Associate Director, Engineering Accreditation Department, BEM
Professor, Faculty of Civil Engineering, UiTM,
40450 Shah Alam, MALAYSIA
shh@salam.uitm.edu.my, sitihawabthamzah@gmail.com
EAD Associate Director (Civil, Structural), Past Council Member IEM, Past Excomm IEM, EAD Lead Panel, P.Eng Principle Interviewer, BEM T&E Comm. Member

Designers

Prof. Siti Hawa, AD
Prof. Ramesh Singh, AD
Prof. Aziz Raman, AD
Prof. Nor Kamariah, AD
Ir Hasril, AD
Ir Liew, AD
Prof. Shahrin Mohammad, AAP
Ir. Assoc Prof. Aziz, AAP
Engineering Accreditation Department
Board of Engineers Malaysia
Best Practices on Accreditation

At the end of this presentation, the participants are able to:

- adopt the EAC accreditation criteria and guidelines
- relate EAC expectation
- discuss issues on EAC accreditation criteria

Focus on Accreditation

- Outcome-based Education (OBE) Programme
- Engineering education content and level (depth) are maintained
- Programme Continual Quality Improvement (CQI)
- Systematic (QMS)
EAC MANUAL 2012

BACHELOR OF ENGINEERING

Qualifying Requirements

<table>
<thead>
<tr>
<th>120 cr hrs (80 engr subjects)</th>
<th>FYP</th>
<th>IT</th>
<th>8 full-time academic staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff-Student Ratio 1:20 (1:15)</td>
<td>External Examiner’s Report</td>
<td>PEOs</td>
<td>POs</td>
</tr>
</tbody>
</table>

EAC criteria

- Academic Curriculum Criteria 1
- Quality Management Systems (QMS) Criteria 5
- Students Criteria 2
- Facilities Criteria 4
- PEOs - POs END PRODUCT
- Academic & Support Staff Criteria 3

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... apart from academic excellence, most employers would require workers to possess qualities such as **good attitude**, strong work **ethics**, the ability to **communicate** well, a **willingness to learn** and to **contribute** new ideas.

..efforts must be taken to improve **communication skills** to encompass both general skills at communicating well with others and the ability to interact socially within a working environment.

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**As advertised in the Sydney Morning Herald (2005)**

**Engineering Graduate**

If you are a final year mechanical, electrical, telecommunications or computer engineering student apply for Engineering Graduate Careers Program.

Impress us with your:

- **Well developed communication and team skills**
- **Aptitude for developing positive business partnerships**
- **Ability to look outside the square**
- **Aptitude for independent problem solving**
- **Strong interpersonal and organising skills**
- **Enthusiastic and proactive approach**
why OBE?

OBE - Definition

Outcome-based education means starting with a clear picture of what is important for students to be able to do, then organising the curriculum, instruction and assessment to make sure that this learning ultimately happens (Spady, 1994)

- excellent communication and interpersonal skills
- highly organised approach
- self-motivated
- innovative
- inquisitive
- desire to gain skills in broad range of areas

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**OBE focuses on student learning by:**

- Using **learning outcome** statements to make explicit what the student is expected to be able to know, understand or do;
- Providing **learning activities** which will help the student to reach these outcomes;
- **Assessing** the extent to which the student meets these outcomes through the use of explicit assessment criteria.

<table>
<thead>
<tr>
<th>Content Based Learning</th>
<th>Outcomes Based Approach (OBE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive students</td>
<td>Active learners</td>
</tr>
<tr>
<td>Assessment process – exam &amp; grade driven</td>
<td>Continuous assessment</td>
</tr>
<tr>
<td>Rote learning</td>
<td>Critical thinking, reasoning, reflection &amp; action</td>
</tr>
<tr>
<td>Content based/broken into subjects</td>
<td>Integration knowledge, learning relevant/ connected real life situations</td>
</tr>
<tr>
<td>Textbook/worksheet focused &amp; teacher centred</td>
<td>Learner centred &amp; educator/ facilitator use group/ teamwork</td>
</tr>
<tr>
<td>See syllabus as rigid &amp; non negotiable</td>
<td>Learning programmes seen as guides that allow educators to be innovative &amp; creative in designing programmes/ activities</td>
</tr>
<tr>
<td>Teachers/trainers responsible for learning - motivated by personality of teacher</td>
<td>Learners take responsibility for their learning, learners motivated by constant feedback/ affirmation of worth</td>
</tr>
<tr>
<td>Emphasis what teacher hopes to achieve</td>
<td>Emphasis outcomes – what learner becomes &amp; understands</td>
</tr>
<tr>
<td>Content placed in rigid time frames</td>
<td>Flexible time frames - learners work at own pace</td>
</tr>
<tr>
<td>Stay in single learning institution until complete</td>
<td>Learners can gather credits different institutions until achieve the intended qualification</td>
</tr>
<tr>
<td>Previous knowledge &amp; experience in</td>
<td>Recognition of prior learning: after pre-assessment,</td>
</tr>
</tbody>
</table>
OBE APPROACH IN CURRICULUM DESIGN

Characteristics of OBE curricula

- Have **programme objectives, programme outcomes, course outcomes** and **performance indicators/criteria or rubrics**.
- Stated objectives and outcomes can be **assessed and evaluated**.
- **Centered** around the needs of the **students** and the **stakeholders**.
- Programme outcomes address **Knowledge, Skills and Attitudes** to be attained by students.
Characteristics of OBE curricula (cont)

- Course outcomes must satisfy the stated programme outcomes. There is no need for ANY (individual) course to address all programme outcomes.
- Teaching/Learning method may have to be integrated to include different delivery methods to complement the traditional LECTURING method.
- Learning outcomes are intentional and assessed using suitable performance indicators.
- CQI must be visible based on the student outcomes.
**OBE Processes**

**FULL CYCLE**

- PEO setting and review
- PEO assessment methods
- PO setting and T&L activities
- PO assessment methods
- CO setting and T&L activities
- CO assessment methods
- Data Analysis

**EVERY SEMESTER, YEAR, FULL CYCLE**

**PEO CQI PROCESSES**

- Communicate the results
- Identify best practices
- Identify new initiatives
- Make necessary changes to the plan
- Analyse the data
- Compare results with what has been plan/trend analysis
- Review the gap
- What can be learnt?

- Identify program objectives (PEOs)
- Map PEOs with POs
- Develop assessment plan for PEOs
- Develop instruments to assess PEOs
- Define performance indicator/ targets/ performance criterion

- Carry out PEOs assessment processes
- Collect appropriate data

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**PO CQI PROCESSES**

- Communicate the results
- Identify best practices
- Identify new initiatives
- Make necessary changes to the plan

- Analyse the data
- Compare results with what has been plan/trend analysis
- Review the gap
- What can be learn?

- Identify program outcomes (PO)
- Map CO with PO
- Specify Curriculum content, TnL approaches/deliveries
- Set performance indicator/targets/performance criterion
- Develop assessment plan

**PLAN**

**DO**

**CHECK**

**ACTION**

---

**CO CQI PROCESSES**

- Communicate the results
- Identify best practices
- Identify new initiatives
- Make necessary changes to the plan

- Analyse the data
- Compare results with what has been plan/trend analysis
- Review the gap
- What can be learn?

- Map CO with PO
- Specify Course content, T&L activities/deliveries, assessment plan (teaching plan/course plan/course outline)
- Define performance indicator/targets/performance criterion

**PLAN**

**DO**

**CHECK**

**ACTION**

---
PROGRAMME OBJECTIVES (PEOS)

- **Specific goals** consistent with the mission and vision of the Institution of Higher Learning, and are responsive to the expressed interest of programme stakeholders describing expected achievements of graduates in their career and professional life after graduation.
- Broad statements
- **Long-term target**, 3 to 5 years after graduation
- Measurement of PEO is done on a regular basis
- There is a **CQI process** on PEO attainment

**CQI Flow for PEO**

- Conduct alumni survey for graduates > 3 years in the industry
- Employer survey (if relevant)
- Face-to-face interview with alumni

**Analysis**

- Propose remedial action
- Trickle into the CQI at the programme outcome level
- Compare PEO achievement previous and current or by graduation cohort

**Activities**

- Identify PEO that did not meet the PI
- Discuss weaknesses
- Identify are of improvement in the curriculum design
- Prepare a CQI report
Characteristics of Good PEO Statement

• Each addresses one or more needs of one or more stakeholders
• Consistent with the mission & vision of the institution
• Number of statements should be limited and manageable
• Should not be simply restatement of programme outcomes
• Forward looking and challenging

Characteristics of Good PEO Statement

Con’t..

• Should be stated such that a graduate can demonstrate in their career or professional life after graduation (long term in nature)
• Distinctive/unique features/having own niche
• Specific, Measurable, Achievable, Result oriented, and having a Time frame (SMART)
• Clear, concise, consistent and reachable
• Reviewed, revised & updated continually
• Has clear link to the programme outcomes & curriculum design
• Publicised & published
PEO1 – **professionalism**

• *Graduates will establish themselves as a practicing professionals in XXXX engineering or related fields*

**Graduate competency** include:
• Professional Engineer or Chartered Engineer
• Specialist in related core areas
• Seniority
• Person of responsibility
• Resource person
PEO2 - CPD

Graduates will engage in lifelong pursuit of knowledge and interdisciplinary learning appropriate for industrial and academic careers

Graduate competency include:
• Participation in conferences, seminars, colloquium, etc.
• Involvement in dissemination of research/experience through publication
• Continuing education through PG courses, specialist courses, competent person in specific area, etc.
• Involvement in R&D
• Involvement in product development
• Academic career
• Entrepreneurs

Sample - PEO Model@UM

PEO3 – societal engagement

Graduates will contribute to sustainable development and the well-being of society

Graduate competency include:
• Membership in professional and non-professional societies
• Involvement in volunteerism activities
• Contribution in terms of donation or time
• Involvement in communities activities
• Use of green technology
• Involvement in sustainable design projects, etc.
• Involvement in community activities

Sample - PEO Model@UM
Other PEO Models

**Leadership**
Graduates of the programme will exhibit leadership in the civil engineering field with strong communication and interpersonal skills.

**Life-long Learners**
Graduates of the programme at will be life-long learners and stay informed of the professional field.

**Contributing Citizens**
Graduates of the programme at will be contributing members of the society by conducting themselves in a responsible and ethical manner.

The programme aspiration in producing a holistic graduates

PO’s
1. Engineering Knowledge
2. Problem Analysis
3. Design/Development of Solutions
4. Investigation
5. Modern Tool Usage
6. The Engineer & Society
7. Environment & Sustainability
8. Ethics
9. Communication
10. Individual & Team Work
11. Life Long Learning
12. Project Management & Finance

PEO’s
PEO1 Professionalism
PEO2 CPD
PEO3 Societal Engagement

Expectation of Industry & Stakeholders
in compliance to the need of the stakeholders in the field of......

Justification to offer the programme
PEOs of Top Engineering Schools

**Harvard University, USA**

• Demonstrated technical competence, including design and problem-solving skills, leading to success in a diverse range of careers or fields of graduate study;
• Shown a commitment to working on solutions to problems with global, economic, environmental, and societal impacts;
• Been successful in a range of leadership and teamwork roles;
• Shown a commitment to lifelong learning through the pursuit of advanced degrees, professional certification, or knowledge of contemporary issues and recent advances in their field.

http://www.seas.harvard.edu/programs/engineering-sciences/abet-accreditation

**Stanford (civil and environment)**

• Graduates will have the ability to establish themselves as practicing professionals in civil engineering or a related field.
• Graduates will have the ability to pursue graduate study in civil engineering or other fields.
• Graduates are expected to work effectively as responsible professionals alone or in teams handling increasingly complex professional and societal expectations.

https://cee.stanford.edu/academics/educational-objectives

**Princeton University (Aerospace Engineering)**

• Our graduates will think critically and creatively and excel in applying the fundamentals of aerospace engineering.
• Our graduates will pursue a life of curiosity with a desire for learning and have the ability and self-confidence to adapt to rapid and major changes.
• Our graduates will advance toward leadership in shaping the social, intellectual, business and technical worlds and by excelling in diverse careers.

http://mae.princeton.edu/undergraduate/educational-objectives-and-student-outcomes

**University of Colorado Boulder (Mechanical Engineering) – associated with Dr. Gloria Rogers (ABET)**

To prepare graduates so that

• They will build on the educational foundation gained through our program by establishing themselves in professional careers and/or pursuing a graduate degree within three years of graduation.
• Begun to generate new knowledge and/or exercise leadership in their positions.

http://www.mse.ucla.edu/objectives-and-outcomes/
PEOs of Top Engineering Schools

North Carolina State University Raleigh (Chemical Engineering) – associated with EM Prof. Richard Felder

• Excel in engineering practices and/or entrepreneurship in various industries, including petrochemical, biochemical, pharmaceutical, fine chemical, environmental, semi-conductor, pulp and paper, advanced materials, and health care industries.
• Advance professionally in positions of increasing leadership responsibilities in their chosen career fields.
• Earn an advanced degree or certification leading to a career in academia, law, medicine, or research and development.
• Exhibit professionalism, a habit of continual learning, interest in contemporary issues of importance to society, appreciation of the impact of engineering development in society, and ethical responsibility—particularly in the context of environmental protection, process/product safety, financial accountability, and community well-being

http://www.che.ncsu.edu/academics/accreditation.html

1. Defined, measurable and achievable.
2. Linked to Programme Outcomes
3. Have own niche.
4. Detailed out and documented.
5. Published.
6. Consistent and linked to mission & vision of IHLs and stakeholder needs.
7. Linked to curriculum design
8. Reviewed and updated.

1. Established process for formulating PEOs.
2. Established process for assessing achievement of PEOs.
3. Established process for evaluating achievement of PEOs.
4. Performance target of the PEOs is achieved.
5. Evaluation results are used in the CQI of the programme

1. High degree of involvement in defining PEO statements.
2. High degree of involvement in assessing the achievement of PEO.
3. High degree of involvement in assessing improvement cycles (CQI).
4. Involved in strategic partnership.
1. State the **vision and mission** of the IHL and/or Faculty
2. List down and state where they are **published**.
3. **Describe** how the **PEOs are consistent** with the **vision and mission** and stakeholder requirements.
4. **Describe the processes** used to **establish/formulate/define and review** the PEOs (survey, meetings, interviews, etc.) and frequency of activities and timelines.
5. **Describe the PEOs** (including performance indicators and performance targets).
6. **Describe steps taken** to ensure achievement of the PEOs, (PEOs are cascaded down to the classroom level).
7. **Describe the processes** used to evaluate the level of achievement of these PEOs by graduates/alumni (survey, meetings, interviews, etc.) and frequency of activities and timelines, and the extent of stakeholders involvement.

8. **Discuss** results of PEOs achievement by graduates/alumni.
9. **Discuss** the Strengths (S), Weaknesses (W), Opportunities of improvements (O), and Threats (T) for each PEO.
10. **Describe how** the results obtained from the PEOs evaluation are being **used in the CQI** to improve the programme, and the extent to which the programme’s various stakeholders are involved in these processes.
11. **Describe further planned CQI** actions in relation to PEOs to be implemented.
12. **Self-assess** on programme performance related to PEOs based on the following scale (with justifications) referring to Appendix GL, EAC Manual 2012:

   *Poor/Satisfactory/Good*
1. **Not following the guidelines** as given by EAC
2. **Poorly written** PEOs statement, more specifically:
   - Not supporting the mission and vision of the university
   - Stakeholders are not involved in the formulation and refinement of PEOs
   - The curriculum design i.e. POs are not linked and supportive of the PEOs attainment
   - Poor understanding of what PEO means
   - PEO reads like a PO
   - No performance indicators or performance indicators are not relevant/realistic
   - Use the term *To produce students* .... or *Student able to*.....
   - The IHL does not have a stand or aspiration or a vision of what the programme intends to produce or see their graduates doing 3 to 5 years after graduation

3. **No discussion** on how stakeholders are involved in the PEOs
4. **Poor description** of how the curriculum design is supportive of the intended PEOs

5. Have not thought about the plan of measurement, **performance indicators** or what would be the **graduates competencies** that would link to each PEOs.

6. **No proper plan** put in place to carry out the alumni survey, most programme would wait until the time for EAC visit to collect survey. As a result, the respond of the survey is poor and there is no deliberation on the survey outcome in the SAR.

7. Most programme would present graphs of PEO alumni survey but do not **discuss the data**.

8. Alumni survey **forms not established** (for new programmes)

9. For existing programmes, alumni survey questions are **not reflective of the graduate competencies** and as such the measurements are not reflective of the intended PEO attainment.

10. The discussion on CQI based on PEO attainment are poorly written or not discussed at all. Is the collected data makes any sense to the programme? What would be the next course of action? When this will take place? When is the next measurement going to be? **Explain the CQI process.**
EAC stand on PEOs

- Assessments of the PEOs achievement by the graduates are still required by EAC.
- There must be a documented, systematically utilised, and effective process, involving programme stakeholders, for the periodic review of these PEOs that ensures they remain consistent with the institutional mission, the programme's stakeholders’ needs, and these criteria.
- If there is shortfalls related to the assessment of the PEOs, it will be classified as Opportunities for Improvement (OFI) rather than Concerns. However, this decision may change depending on the severity in not fulfilling the EAC Manual 2012 on PEOs.

PROGRAMME OUTCOMES (POs)

- Statements that describe what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviours that student acquire through the programme.
- Specific statements on key graduate attributes
- Achieved before or at the time of graduation

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Characteristics of Good PO Statement

- Each describes an area of knowledge and/or skills that a person can possess – Explicit!
- Should be stated such that a student can demonstrate before or by the time of graduation
- Should be supportive/responsive of/to one or more programme objectives (must be linked to the programme objectives)
- Do not have to include measures or performance expectations
- Take advantage of the “unique” character of the Institution
- Should meet the specific programme criteria
- Package: knowledge, skills, attitude
- Cover the minimum of the 12 graduate attributes (or EAC - PO) as stated in the EAC Manual 2012 for engineering programmes in Malaysia
- EAC will not penalize any programmes that adopt directly all the 12 EAC – PO as stated in the EAC Manual 2012
<table>
<thead>
<tr>
<th>PO</th>
<th>Characteristics</th>
<th>WK</th>
<th>WP/EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO1</td>
<td>Engineering Knowledge: Apply mathematics, natural science, engineering fundamentals and engineering specialization to the solution of complex engineering problems</td>
<td>WK1, WK2, WK3, WK4</td>
<td>WP</td>
</tr>
<tr>
<td>PO2</td>
<td>Problem Analysis: Identify, formulate, research literature &amp; analyse complex engineering problems using first principles of mathematics, natural sciences and engineering sciences</td>
<td>WK1, WK2, WK3, WK4</td>
<td>WP</td>
</tr>
<tr>
<td>PO3</td>
<td>Design/Development of Solutions: Design solutions for complex engineering problems and design systems, components or processes with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.</td>
<td>WK5</td>
<td>WP</td>
</tr>
<tr>
<td>PO4</td>
<td>Investigation: Conduct investigations of complex problems using research-based knowledge and research methods</td>
<td>WK8</td>
<td>WP</td>
</tr>
</tbody>
</table>

**Graduate Attributes PO1-PO12**

Seoul’s 2013 version proposed for adoption as 12 EAC’s POs (for inclusion in EAC Manual 2016)

<table>
<thead>
<tr>
<th>PO</th>
<th>Characteristics</th>
<th>WK</th>
<th>WP/EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO5</td>
<td>Modern Tool Usage: Create, select and apply modern engineering and IT tools including prediction and modelling to complex engineering problems</td>
<td>WK6</td>
<td>WP</td>
</tr>
<tr>
<td>PO6</td>
<td>The Engineer and Society: Apply reasoning to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems</td>
<td>WK7</td>
<td>WP</td>
</tr>
<tr>
<td>PO7</td>
<td>Environment and Sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems</td>
<td>WK7</td>
<td>WP</td>
</tr>
<tr>
<td>PO8</td>
<td>Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.</td>
<td>WK7</td>
<td>-</td>
</tr>
</tbody>
</table>
Graduate Attributes **PO1-PO12**

Seoul’s 2013 version proposed for adoption as 12 EAC’s POs (for inclusion in EAC Manual 2016)

<table>
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<th>PO</th>
<th>Characteristics</th>
<th>WK</th>
<th>WP/EA</th>
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</thead>
<tbody>
<tr>
<td>PO9</td>
<td>Communication</td>
<td>-</td>
<td>EA</td>
</tr>
<tr>
<td></td>
<td>Communicate effectively on complex engineering activities with the engineering community and with society able to comprehend, write, present, give and receive instructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PO10</td>
<td>Individual and Team work</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Function effectively as an individual, member or leader in diverse teams and in multi-disciplinary settings</td>
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<td></td>
</tr>
<tr>
<td>PO11</td>
<td>Lifelong learning</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>Recognize the need, prepare and engage in independent and life-long learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PO12</td>
<td>Project Management and Finance</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Demonstrate knowledge and understanding of engineering management principles and economic decision-making, apply to own work, as a member and leader in a team, manage projects and in multidisciplinary environments</td>
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<td></td>
</tr>
</tbody>
</table>

Knowledge Profile **WK1-WK8**

- WK1: Natural sciences
- WK2: Mathematics
- WK3: Engineering fundamentals
- WK4: Specialist knowledge
- WK5: Engineering design
- WK6: Engineering practice
- WK7: Comprehension
- WK8: Research literature
Measurement of POs

.... must be **directly** (as main evidences) and **explicitly** assessed

Continual Quality Improvement (CQI)

.... improvement must be **harmonised, holistic and continually demonstrated** at both the course and programme levels
**CQI Flow for CO**

- **Student feedback on CO achievement (in direct)**
- **Students output from direct assessment on each CO (direct)**

**Analysis**
- Conduct every semester
- Identify CO that is below the PI
- Identify weaknesses
  - Teaching-Learning methods not suitable?
  - Student attitude?
  - Fundamentals weak?
  - Assessment & Evaluation Tools appropriate?
  - CO appropriate?
  - Level of difficulty appropriate?
  - Learning environment suitable?
- Prepare a CQI report on CO attainment once every semester for each course

**Propose remedial action**

**Perform corrective measures**

**Compare student performance in CO, previous and current**

**CQI Flow for PO**

- **Direct**
  - Extract data from all courses or selected courses linked to each PO
- **Indirect**
  - Extract data from Industrial Training Survey / Exit Survey / IAP / EE

**Analysis**
- Monitoring to be done every semester
- Identify PO that is below the PI
- Identify weaknesses
  - Teaching-Learning methods
  - Courses that perform poorly in terms of PO attainment
  - Assessment & Evaluation Tools appropriate?
  - CO-PO link appropriate?
  - Learning environment suitable?
- Prepare a CQI report on PO attainment once a year

**Propose remedial action**

**Ensure that the corrective measures are implemented in the courses**

**Compare student performance in PO, previous and current**

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PROGRAMME OUTCOMES (POs)

- Results obtained by inference or embedded together with other POs **are not acceptable**.

- Programmes shall conduct a **self-assessment** (evaluation) of the results obtained from assessments of the achievement of the POs. The evaluation shall **describe the strength, weakness, and opportunities for improvement** identified by the programme.

- Programmes shall be able to demonstrate its **continual improvement process based on the results** of POs assessments.

- The results of the assessment process for the POs shall be applied for Continual Quality Improvement (CQI) of the **programme**, not the individual student.
PROGRAMME OUTCOMES (POs)

• The evidence of student learning is actually required to identify student strengths and weaknesses related to the outcomes for the purpose of making decisions about how to improve the programme teaching/learning processes.

• EAC does not impose or suggest any specific OBE model. However, any chosen model shall be able to tell how well programme is doing towards attaining student outcomes and able to demonstrate the true achievement of the POs by all graduates.

• It is not necessary to collect data on every student in every course and every semester to show the attainment of the POs. However, it is necessary that the Course Outcomes (CO) are being measured for students in every course for the purpose of CQI at the course level.

• PO results may come from one data point on each student in the programme cohort to determine if the performance has been met. This relates to the fact that learning is cumulative over time.

• A programme does not have to assess every PO every year to know how well it is doing toward attaining student outcomes.

SAR – Guidelines for POs

1. List down the POs and state where they are published.
2. Describe how the POs relate to the PEOs.
3. Describe how the POs explicitly encompass the Section 4.0, EAC Manual 2012 (draft revision 2016 based on IEA Seoul V3 Graduate Attribute Profiles) 12 POs. If adopt directly then say so & make sure that the 12 POs are supporting the PEOs
4. Define each PO explicitly, i.e. elaborate on its attribute areas and indicators of PO achievement by the students i.e. breakdown of abilities relevant to each PO so that relevant COs can be mapped to the POs (if applicable). Explain your strategies in measuring each PO explicitly (When? How? Who?)
5. Provide the programme overall or big-picture mapping matrix of courses to POs (may use Courses to POs’ mapping matrix (App. G EAC Manual 2012)).
6. Describe how relevant CO marks from the related courses are used to determine the achievement of each POs at the programme level, i.e. detail out each PO achievement criteria explicitly based the ‘pooled’ COs marks (must pass all, average marks, passing some, etc.). Deliberate on your PO model!... How do you assume the final PO achievement of individual students?

7. Discuss the results of POs achievement, PO by PO explicitly.

8. Discuss the Strengths (S), Weaknesses (W), Opportunities of improvements (O), and Threats (T) for each PO.

9. Describe how the results obtained from the POs evaluation are being used in the CQI to improve the programme. Focus on how the CQI can be considered harmonised, holistic and continual both at courses and programme levels. Discuss your CQI strategies at the course level and programme level.

10. Describe any POs related established management system (computer software etc.)

11. Describe the extent to which the programme’s various stakeholders are involved in the above processes.

12. Describe further planned CQI actions to be implemented.

13. Self-assess on programme performance related to POs based on the following scale (with justifications):

* Poor/Satisfactory/Good
The SAR & POs – Issues

1. Not following the guidelines as given by EAC
2. IHL’s POs do not cover all EAC 12 POs.
3. Some programmes have so-called POs that varies from 10 to 60.
   What matters, the IHL’s must show explicitly how the 12 EAC-POs are delivered and assessed.
4. No deliberation on the PO assessment plan and strategies/plan adopted to measure each of the POs explicitly (eg. on yearly basis and the final achievement at the time of graduation).
5. No systematic assessment plan and no Performance Indicators for CO and PO attainment.
6. Some programmes give low emphasize on certain POs (eg. Project Management & Finance - covered in bits and pieces in several courses without delivering the depth required as other POs: Industrial Training and FYP – attainment is based on (1) having a Gantt Chart and (2) a listing of materials purchased for the project. All POs are equally important!

7. Mapping of courses to POs are not realistic. Courses and so the COs are linked to the wrong POs. Hence any measurement made in the course are not reflective of the intended PO. For example Statics are linked to PO related to ethics.
8. Could not provide the evidences to support the direct assessment of specific POs
9. PO assessment – Programme based or individuals? KPI – all students must achieved? Can we accept x % attainment?
10. Using CGPA to demonstrate PO attainment.
11. Not able to demonstrate the EXPLICIT measurement of each PO and the use of relevant rubrics. For example, Integrated Design is linked to several POs, however the assessment on each PO is not done separately.
12. Sampling acceptable? Students sampling and PO sampling?
13. Averaging the PO attainment from Year 1 to Year 4 as indication of the students final attainment acceptable?

14. Not able to demonstrate how the PO attainment is used to bring about a continual quality improvement in the course and programme.

15. For 1st cycle accreditation or new programme going for first time accreditation, the IHL could only show PO measurement for few semesters only; could not demonstrate how CQI has taken place at the course and programme level; could not explain their PO model, etc.

16. For existing programme going through a new cycle accreditation, the IHL could not show and discuss the PO attainment for the graduating students. PO data is not available for the past 4 years. CQI is not visible across the course level and programme level. Could not provide evidences such as CQI reports, minutes of meeting, etc. No systematic plan for CQI.

17. For IDP or Capstone Design, could not provide the relevant rubrics used for the direct assessment of each PO.

18. Poor comprehension of Complex Engineering Problem and Complex Engineering Analysis

19. Students are not aware/inform of their PO achievement.

**EAC stand on POs**

**Minor concern**

The direct and explicit assessment of each of the 12 generic graduate attributes as stipulated in the EAC Manual 2012 and the harmonisation of the POs to bring about a holistic programme improvement need to be continually demonstrated

Key words: direct; explicit; harmonisation; holistic programme improvement

**Major concern**

The direct and explicit assessment of each of the 12 generic graduate attributes as stipulated in the EAC Manual 2012 and the harmonisation of the POs to bring about a holistic programme improvement has not been demonstrated
**Weakness**

- No OBE assessment plan – assessment only based on grading GPA-CGPA. Out of 12 Pos, only a few available (say 1-3)
- Major issues on constructive alignment (learning outcome–activities–assessment)
- Majority Academic staff do not comprehend the OBE concept
- Majority students do not take charge in the learning process (do not understand OBE)
- Management lacks in giving direction on OBE matters – limited training/workshop to limited staff.

**EAC criteria**

- **Academic Curriculum Criteria 1**
- **Quality Management Systems (QMS) Criteria 5**
- **Students Criteria 2**
- **Facilities Criteria 4**
- **Academic & Support Staff Criteria 3**
- **PEOs - POs END PRODUCT**
When describing, reflect on what you have done, if there is gap in your practice as compared to the requirement then plan for mitigation measure as part of your CQI.

Curriculum Content

Programme Structure
- Technical
- Non-technical

Balance
- Essential elements
- Additional specialist

Theory to Practice
- Lab work
- Engineering practice

Cover the broad areas of their respective disciplines

Breadth and depth
### APPENDIX B

#### Engineering Sciences, Principles and Applications

<table>
<thead>
<tr>
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### APPENDIX B

#### Mathematics, Statistics and Computing

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Table 2: Distribution of Engineering Courses

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<th>Groupings</th>
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<tr>
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Total Contact Hours

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<td>Final Year Project</td>
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TOTAL CREDIT HOURS FOR ENGINEERING COURSES: xx
Table 4: Distribution of General Education Courses

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TOTAL CREDIT HOURS: 26.56
TOTAL CREDIT HOURS: 6
TOTAL CREDIT HOURS: 13

TOTAL CREDIT HOURS FOR GENERAL EDUCATION COURSES: 47.57

Delivery and Assessment

The overall process of learning is built on a framework of curriculum design in which intended learning outcomes, teaching methods, assessment and evaluation are all inter-dependent and only by truly integrating these components together, do we get efficient student learning.

Why is that so?
Constructive Alignment

Intended outcomes must clearly be indicated

Activity will match outcomes

Lecturer’s Intention

Delivery Method

PO
CO
Taxonomy

Assess intended outcomes

Why is the alignment important?

Laboratory

TAXONOMY LEVEL

Open Ended

Procedure-based

Prescriptive
Final Year Project

- Appropriate level
- Appropriate to the programme

- Academic staff
- Qualified engineer from industry

- Individual
- Specific Criteria / Rubrics

- Literature
- Modern tools

Industrial Training

Exposure to professional engineering practice

- 8 weeks minimum, 2 weeks per credit, 6 credits max

Structured, supervised & recorded

Must be conducted before the final semester

Why 8 wks? Logbook? Before final sem?
Exposure To Professional Practice

- Lectures/talks by industry guest lecturer
- Academic staff with industrial experience
- Courses on professional ethics and conduct
- Industry visits
- Industry-based FYP
- Logbook recording industrial experience

**Integrated Design Project**

- Integrated Design
  - Processes
  - Component

- Complex
  - Engineering problem
  - Design systems

- Issues
  - Public health and safety
  - Culture
  - Society
  - Environment
Conditions for Passing Courses

Unless the continuous assessment approach adopted can demonstrate the attainment of the depth of knowledge, IHLs are strongly reminded to ensure that no student shall pass a course if they fail in their final semester examination.

Complex Engineering Problems

WP1-WP7

- **Depth of knowledge required**
  - WP1 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

- **Range of conflicting requirements**
  - WP2 wide-ranging or conflicting technical, engineering and other issues

- **Depth of analysis required**
  - WP3 no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
Complex Engineering Problems

WP1-WP7

**Familiarity of issues**
- WP4 infrequently encountered issues

**Extent of applicable codes**
- WP5 outside problems encompassed by standards and codes of practice for professional engineering

**Extent of stakeholder involvement & conflicting requirements**
- WP6 diverse groups of stakeholders with widely varying needs

**Interdependence**
- WP7 high level problems including many component parts or sub-problems

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**Internal Audit/Moderation**

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Q’s with CP
- Q1 (m) Q2 (m) Q3 (m) Q4 (m) Q5 (m) %

**Attributes**
- **Depth of knowledge**
  - WP1: Yes / No & Comments:
    - WK3
    - WK4
    - WK5
    - WK6
    - WK8

- **Range of conflicting requirements**
  - WP2: Yes / No & Comments:

- **Depth of analysis**
  - WP3: Yes / No & Comments:

- **Familiarity of issues**
  - WP4: Yes / No & Comments:

- **Extent of applicable codes**
  - WP5: Yes / No & Comments:

- **Extent of stakeholder involvement**
  - WP6: Yes / No & Comments:

- **Interdependence**
  - WP7: Yes / No & Comments:
Complex Engineering Activities

**EA1-EA5**

**Range of resources**

- **EA1** diverse resources includes people, money, equipment, materials, information and technologies

**Level of interactions**

- **EA2** resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues

**Innovation**

- **EA3** creative use of engineering principles and research-based knowledge in novel ways

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**Consequences to society and the environment**

- **EA4** significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation

**Familiarity of issues**

- **EA5** extend beyond previous experiences by applying principles-based approaches
### Internal Audit/Moderation

**WA assigned with EA**

**WA10** Level of communication according to type of activities performed

<table>
<thead>
<tr>
<th>Projects/Performance/Activities with EA</th>
<th>(m)</th>
<th>%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Some or all of the following characteristics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of resources</td>
<td>EA1 Yes / No &amp; Comments:</td>
</tr>
<tr>
<td>Level of interaction</td>
<td>EA2 Yes / No &amp; Comments:</td>
</tr>
<tr>
<td>Innovation</td>
<td>EA3 Yes / No &amp; Comments:</td>
</tr>
<tr>
<td>Consequences to society and environment</td>
<td>EA4 Yes / No &amp; Comments:</td>
</tr>
<tr>
<td>Familiarity of issues</td>
<td>EA5 Yes / No &amp; Comments:</td>
</tr>
</tbody>
</table>

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**THE DO’S**

- **Keep abreast with the latest developments**
  - Check on the contents, depth and breadth, quality of assessments, complex problems and taxonomy level evaluation at both course and programme levels.
- **FYP, Group Design Project, Final Year courses that can confirm the students POs attainment. Courses with WP, EA & WK**

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**THE DO’S**

- **Bench-marking**
- **Complex Problem Complex Activities**
- **Culminating Courses**
- **Taxonomy Level**

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**WP & EA characteristics**

- **Complex**
- **Problem Complex Activities**

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**THE DO’S**

- **CQI self assess**
- **SWOT stakeholder**

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**Minor concern**

Indirect measurements are not effective.
Some core courses/materials are not given enough time/credits.
Delivery for effective teaching & learning.

**Major concern**

Significant number of courses are not addressing the required cognitive level and knowledge profile of engineering programme especially for core courses like FYP, Design Project etc.

Conditions for passing not fulfilled in many courses.

Insufficient coverage of core materials as specified in Appendix B (EAC Manual 2012)

**Weakness**

Programme total credits less than 120, engineering courses less than 80 credits.
Level is a technologist education.

**EAC criteria**

- Academic Curriculum Criteria 1
- Quality Management Systems (QMS) Criteria 5
- PEOs - POs END PRODUCT
- Facilities Criteria 4
- Students Criteria 2
- Academic & Support Staff Criteria 3
2.1 Student Admission – Entry Requirements

- Minimum Qualification – Good Maths & Physics
- Normal Entry = STPM (Good Principal Passes in Maths & Physical Science)
- If this is not met – Remedial Programme?
- Equivalent Qualification Also Accepted – Matriculations, Foundation, A-Level etc.
- Diploma Holder – CGPA Requirement
2.1 Student Admission – Transfer Policy/Selection Procedure

- Clear, Documented & Enforced Policy on Admission & Transfer
- Published Academic Regulation?
- Mechanism of Credit Transfer/Exemption to allow for Alternative Education Pathways
- Policy of Credit Transfer for Diploma – Distinction between Own and other IHL
- Max 30% of Credit
- Mechanism of Transfer – Grade C or better, 75% similarity on syllabus

2.2 Student Development - Counselling

- System to Monitor Student Performance
- Academic Advising
- Counselor Qualification
- Assistance in Handling Students Problem (Financial, Emotion, Spiritual, etc.)
2.2 Student Development - Workload

Student not to be burdened – Check SLT

Credit Hour per Sem:
→ 18-25 (Poor)
→ 16-17 (Satisfactory)
→ 15 or less (Good)

Is workload appropriate & allow for co-curricular, personal activities?

2.2 Student Development – Co-Curricular Activities

Student Organisations – Management & Governance, Leadership, Teamwork

Social/Technical/Professional Activities - Outreach Programmes, Competition, Motivational Talks, Visits

Support Programme – Improve Generic skills, Internship Abroad, Global Outreach Programme
2.2 Student Development – Observed Attainment of PO

- Student performances in relation to PO attainments – holistically, academic and co-curricular, e.g.
  - Core principles of engineering
  - Communication skills, confidence, critical thinking
  - Contemporary, ethical, sustainability issues

- CQI actions on their attainments
## EAC stand on Students

<table>
<thead>
<tr>
<th>Minor concern</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some students intake below acceptable qualification, <strong>without remedial courses</strong>, and performed badly throughout the study. Some significant <strong>violation</strong> of the max. 30% credit transfer. Credit transfer wrongly awarded. Heavy workload, and students are complaining. Students not able to communicate well, not familiar with environment and sustainability issues or other POs.</td>
<td>Widespread student intake below normal acceptable qualification as stipulated in the EAC Manual 2012. Widespread violation of the 30% maximum allowable credit transfer. Intentionally planned “back door” students’ intake, for commercial purpose.</td>
</tr>
</tbody>
</table>

## Triangulation

- Teamwork – how many in a group (max 5)
- Investigative research – library usage, journals, latest reference, code of practice, authentic softwares
- Laboratory equipments – functioning, maintained, teaching vs research labs eg: FYP
- How many site visits/technical talks/industry speakers?
- Best about the IHL
- Need to improve
EAC criteria

Quality Management Systems (QMS)
Criteria 5

Academic Curriculum Criteria 1

PEOs - POs
END PRODUCT

Facilities Criteria 4

Students Criteria 2

Academic & Support Staff Criteria 3

Academic Qualification & Adequacy of Staff

Professional Qualification, Experience & Development

Research / Publication / Consultancy

Industrial Involvement

Teaching Load / Contact Hours

Motivation & Enthusiasm

Use of Lecturer from Industry / Public Body

Awareness of OBE approach

Development & Assessment

Academic Staff : Student Ratio
Academic Staff – Qualification

Min. 8 Full Time Academic Staff *RELEVANT* to the Programme

Part time vs. Full time.
FTE equivalent of PT < 40%

Professional Qualification, P.Eng, C.Eng.

Academic Staff without PG qualification? – At least 10 years work exp. + Professional qualification (P.Eng, C.Eng)

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Academic Staff – Experience & Development

Range of teaching & industrial experience of staff

Good blend between young and more senior staff

Relevant PE among staff serving the programme

Is design/elective course taught by experienced academic (with consultancy /industrial exp.)

Staff development policy (scholarship for PhD, Industrial attachment, driver for PE attainment)
PE Requirement

- Requirement of having minimum of 3 PE serving each programme by 2015

- Other equivalent PE qualification from other bodies from any of the IPEA and APEC members can be accepted

- MIEM, C.Eng, CP.Eng, P. Eng

International Professional Engineers Agreement (IPEA) Members (http://www.ieagreements.org/EMF/)

1. Australia - Engineers Australia (1997)
2. Canada - Engineers Canada (1997)
3. Ireland - Engineers Ireland (1997)
5. Hong Kong China - The Hong Kong Institution of Engineers (1997)
10. Malaysia - Institution of Engineers Malaysia (1999)
15. Chinese Taipei - Chinese Institute of Engineers (2009)
Asia Pacific Economic Cooperation (APEC) Engineers
http://www.ieagreements.org/APEC/signatories.cfm

1. Australia - Engineers Australia (2000)
2. Canada - Engineers Canada (2000)
3. Hong Kong China - The Hong Kong Institution of Engineers (2000)
9. Indonesia - Persatuan Insinyur Indonesia (Institution of Engineers) (2001)
12. Chinese Taipei - Chinese Institute of Engineers (2005)

Academic Staff – Research, Publication, Consultancy

Overall competency maybe judged by:
- Consultancy participation
- Collaborative research
- Grants secured
- Conference attended
- Postgraduate supervision
- Research that permeates in students’ learning such as FYP

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Academic Staff – Industrial Involvement

Describe involvement of staff in industry

- Visit/attachment
- Consultation/Training
- Research collaboration
- Expert advisor
- Supervision – Industrial PhD
- Mentoring junior engineer, e.g. IEM logbook scheme
- Collaboration in Capstone Design/FYP

Mechanism/policy/training scheme put in place to encourage staff for industrial exposure?

Is staff motivated to get involved with the industry?

Academic Staff – Teaching Load/Contact Hour

- Reasonable load – allow for engagement in student consultation, research, publication, administration, supervision, scholarly and professional activities
- Guidelines for average teaching load:
  - < 12 hours = Good
  - 12 - 15 hours = Satisfactory
  - > 15 hours = Poor

Consultancy/Scholarly Activities
Teaching/Student Consultation
Research & Publication
Academic Staff – Use of lecturer from industry/ public bodies

- Engagement of engineers/practitioners from relevant industry/public body for talks/seminars/competition jury/capstone design etc.
- Supplement normal teaching. Exposure for professional practice
- Is mechanism/method to utilize industry/public body lectures put in place?
- Is industry engagement relevant/effective to students?

Academic Staff – Awareness of OBE-approach to education

- All staff aware of OBE? OBE ~ CQI
- Staff understand PEO, PO and CO assessment
- Process in place to ensure staff understand OBE
Support Staff – Laboratory & Administration

- Sufficient, qualified, experienced technical & administrative staff supporting the programme
- Competent within their scope of work
- Qualification levels (Diploma, Certificate, Degree):
  - > 80% = Good, 60% - 80% = Satisfactory, < 60% = Poor
- Staff handling heavy machines or specialized equipment is well-qualified and competent

Support Staff – Adequacy

- 1 Staff : 1 Lab (Good)
- 1 Staff : 2 Labs (Satisfactory)
- 1 Staff > 2 Labs (Poor)
Staff Development

- Clear policy & plan for staff development (academic and support)
- Process in place for research funding, conference, training sabbatical leave, industrial attachment, technical training etc.
- Financial support for further study (Masters, PhD.)
- Flexible hours to enable staff to participate in professional activities, consultancy, research etc.

Staff Assessment

- Systematic process for staff yearly appraisal
  - Student feedback
  - Research contribution
  - Professional bodies
  - Academic contribution
  - Administrative contribution
  - Service to university
  - Community service etc.

- Is there established working system for student feedback?
- How student feedback be used for CQI
- Mechanism for high flyer staff being recognized
Staff – Student Ratio

Staff : Student > 1:20 for some periods prior to visit (even though ratio is OK during the visit)
Almost all academic staff are young, inexperienced in teaching and professional practice
Unacceptable academic and support staff workload
Staff not aware of the big picture of OBE and CQI activities at programme level
Lack participation of engineers from industry and professional bodies to deliver seminar, lecture, talks, etc.

Concern

Non-Compliance to the Qualifying Requirement as stipulated by EAC Manual 2012 – Min 8 full time academic staff & Staff:Student ratio > 1:20
Total failure in fulfilling minimum 3 PE or other acceptable professional qualifications

Weakness

1:15 or better Good
1:20 – 1:15 Satisfactory
> 1:20 Poor
EAC criteria

Quality Management Systems (QMS)
Criteria 5

Academic Curriculum Criteria 1

PEOs - POs
END PRODUCT

Academic & Support Staff Criteria 3

Facilities Criteria 4

Students Criteria 2

Teaching & Learning Facilities

Adequacy & Quality

- Classrooms, study areas
- Learning-support facilities
- Information resources (library)
- Computing and information technology systems, (min. 1 PC : 10 Students)
- Laboratories and workshops
- Associated facilities to cater students needs

availability and accessibility to students
Laboratories

Sufficiency & Appropriateness

- gain substantial experience in understanding and operating engineering equipment and of designing and conducting experiments
- reasonable representative of modern engineering practice
- maintenance procedures
- calibration of equipments

Lab Facilities not at Site

Indicate clearly the arrangements to provide reasonable accessibility and opportunity for learning.
Assess the effectiveness if students complete the experiments over a short period of time rather than being spread out (as in the case of the main campus)
Indicate the number of students per equipment

Health, Safety & Environment

Assess HSE policy and procedures especially in the Laboratories. Are they pervasive? Publish publicly?

Support Facilities

- adequacies & relevancies of • hostels • sport & recreational centres • health centres • student centres • eateries to enhance character building
- transportation adequacy to facilitate students’ life on campus
- wifi

Part Time, Distant Modes

at multiple or remote locations, assess how the facilities support student learning with respect to their equivalence to those provided for on-campus students. (esp. IR, ICT)
when 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), assess the effectiveness of such a practice.
## EAC stand on Facilities

### Concern
- Calibration of laboratory equipment neglected
- Improper location of the shower and eye wash
- Cleanliness and arrangement of laboratory equipments posing health and safety hazard
- Pirated engineering software
- Group size per equipment is more than 5 students
- Fire extinguisher, first aid box, emergency evacuation

### Weakness
- Insufficient laboratory equipments to support teaching and learning.
- Lack of health and safety culture and conduct in the laboratories

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## EAC criteria

- **Academic Curriculum Criteria 1**
- **Quality Management Systems (QMS) Criteria 5**
- **PEOs - POs - END PRODUCT**
- **Facilities Criteria 4**
- **Students Criteria 2**
- **Academic & Support Staff Criteria 3**
Institutional Support

**Sufficient to assure quality and continuity of the programme**

- A **good governance and leadership** in leading the programme
- Funding allocated to the programme on **yearly basis for curriculum development**, etc.
- Funding available for **student activities**
- Support from **external bodies** which may be in the form of monetary, awards, sponsorships, attachment opportunities for staff & students, etc.
**Sufficient to attract & retain well-qualified academic and support staff**

**ATTRACTING**
- Is there highly qualified senior staff appointed at the level of Professor and/or Associate Professor level?
- Is there highly experienced staff with solid industrial experience and have the PEng. qualification?
- Is there any other policy which can be considered as appealing to the academic staff/support staff such as consultancy policy, reward policy, medical policy, etc.?
- Is there a policy on appointment & promotion of academic staff, admin staff and general staff?

**RETAINING**
- Retention Strategies include competitive remuneration, comprehensive staff compensation and benefits scheme, continual professional & academic growth, promote work life balance, clearly-defined KRAs & KPIs, promote good collegial relationship, conducive work environment, fees discount for children of staff members, etc.

**Are there Policies on Staff Professional Development** such as:
- Sponsorship to attend Training & Conference
- Research/Sabbatical leave, Industrial Attachment
- Monetary incentive for attaining Peng status such as monthly allowance, one-off payment, etc.
RETAINING (con’t.)
• Reimbursement of annual professional membership fees
• Allows and encourages staff members to engage in professional activities in learned societies or regulatory bodies
• **Sponsors** specialised trainings on T&L for academic staff members and skill-based training for support staff
• Sponsors national and international conferences for its academic staff
• Provision of appropriate tools & technology

REWARDING
• Policy on Staff Service Excellence Award, Teaching Excellence Award
• Policy on Performance Linked Rewards based on Performance Appraisal

Sufficient to acquire, maintain and operate facilities & equipment

• Any **new infrastructural development** since the last accreditation visit or any future plan for new infrastructure?
• Is there **maintenance and calibration budget** allocated for equipment?
• Updates, upgrades and maintenance of **existing infrastructures** such as:
  ▪ Building Infrastructures – class rooms, auditorium, toilets, canteen
  ▪ Transport Infrastructure – bus services, parking facilities
  ▪ Communication Infrastructure – Wi-Fi, Broadband
  ▪ Economic Infrastructure – banking facilities, post office,
  ▪ Social Infrastructure – health care, counselling, welfare system
  ▪ Cultural, Sports & Recreational Infrastructure – sports facilities, museums, libraries, function halls
1. Is there a **system / process** put in place for **quality control** such as the MS ISO 9001:2015 quality management system that covers all aspects of curriculum, Teaching & Learning and assessment?

2. Is there sufficient policies/rules/regulations/procedures put in place in the IHL to cover all academic matters and whether those systems are implemented? This may include:
   - Reviewing PEOs and POs
   - Tracking the contributions of individual courses to the Programme Outcomes, tracking performance assessment processes
   - Reviewing of curriculum content, delivery methods
   - Reviewing the comments from External Examiners
   - Reviewing feedback and inputs from stakeholders including students, IAP, alumni, etc.

3. Is there other forms of quality control implemented such as board of studies and **benchmarking exercise**.

   *The IHL is expected to demonstrate the effectiveness of such quality assurance system towards improvement of the overall programme quality.*
1. For a new cycle accreditation, there shall be at least **two (2)** External Examiner’s report available for the programme.

2. The EE should be a person of high academic standing in the same field of the programme.

3. The EE is expected to carry out the overall assessment of the programme and the report should cover the major components as stipulated in **Appendix E** of the EAC Manual 2012.

4. The EE recommendations have been addressed by the IHL as part of the CQI of the programme – Panel is expected to see the proof of the closing of the loop such as minutes of meeting, etc.

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**Recommended TOR for EE (Extracted from the EAC Manual 2012, page E1)**

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

(i) Assessment of programme curriculum (e.g. objectives and outcomes).

(ii) 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.

(iii) Assessment of staff-student ratio and student workload. If found to be not sufficient, corrective action to be taken by the IHL.

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

(v) 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.

(vi) 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.

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

(viii) Assessment of examination procedures and regulations.

(ix) Management commitment towards the programme.
Advisory Panel from Industries and Other Relevant Stakeholders

1. The programme shall have an industrial advisory panel (IAP) or equivalent committee with members drawn from industry and other relevant stakeholders.
2. The IAP members should be Senior Engineers / Engineering Managers from the relevant industry. There should be at least 3 to 5 members.
3. There should be proper letter of appointment and TOR for the IAP members.
4. There should be evidence of meetings and dialogues with the IAP. Frequency of meeting – at least once a year
5. There should be evidence of the involvement of the IAP in the CQI initiatives of the programme
6. There should be evidence of closing the loop on the recommendations made by the IAP in terms of enhancing the quality of the programme.

Quality Assurance

System for student admission, teaching and learning

1. Is the following activities linked to the programme which is certified to an established quality assurance standard such as MS ISO 9001:2015 quality management system:
   - Student admission for local students and international students
   - Teaching & Learning activities including assessment and grading
2. If there is no such QMS put in place, Panel shall assess if there are established policies / regulations / processes that covers the above activities (please note that the IHL may have ISO certification that do not include the T&L components)
1. Is there a quality system put in place which may include rules / regulations and processes to cover the following?

- **Assessment & evaluation** of examination, course work, projects, industrial training regulation, grading, exam paper preparation and moderation, FYP matters, LI matters, IDP matters, etc.
- Are there **rubrics available** to help with the assessment?
- Are the rubrics meaningful and relevant?
- Is the **scope of assessment** is wide enough to cover the achievement of the respective POs

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**Tracking Mechanisms for CQI**

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QMS

- **Programme planning**
  - Reviewing of PEOs and POs
  - Responding to EE comments

- **Curriculum development**
  - Tracking outcomes through systematic assessment

- **Quality Assurance & Benchmarking**
  - Tracking contribution of individual courses to POs
  - Responding to feedback and inputs from stakeholders
```

- **Curriculum and content review**
**Contingency & Sustainability**

- **Concern**
  - Quality assurance processes and policies are not deliberated.
  - Closing of the loop at all levels are not explained such as the QMS on EE, QMS on IAP, QMS on curriculum design, QMS on PEO & PO, QMS on examination, etc.
  - QMS related to benchmarking exercise, health & safety, maintenance & calibration of equipment, adequacy of academic & support staff, etc. are not discussed.

- **Weakness**
  - QMS not in place affecting CQI conduct
  - Loose process exam regulation, moderation of examination papers

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**EAC stand on QMS**

- **Concern**
  - Quality assurance processes and policies are not deliberated.
  - Closing of the loop at all levels are not explained such as the QMS on EE, QMS on IAP, QMS on curriculum design, QMS on PEO & PO, QMS on examination, etc.
  - QMS related to benchmarking exercise, health & safety, maintenance & calibration of equipment, adequacy of academic & support staff, etc. are not discussed.

- **Weakness**
  - QMS not in place affecting CQI conduct
  - Loose process exam regulation, moderation of examination papers
REFERENCES

• EAC Manual 2012, Board of Engineers Malaysia

• IEA Graduate Attributes and Professional Competency Profiles, Version 3: 21 June 2013