Malaysia & International Engineering Alliance (IEA)/Washington Accord

by

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Director
Engineering Accreditation Department (EAD)
EAC/BEM

Presentation Highlights

This presentation shares important experiences of the Board of Engineers Malaysia (BEM)/Engineering Accreditation Council (EAC) towards becoming full signatory of the Washington Accord (WA).
‘MALAYSIA, TRULY ASIA’

— Tourism Malaysia

- 60% Malays, 30% Chinese, 10% Indians
- Muslims, Buddhists, Hindus, & Christians
- Stable, power sharing political system
- 55 years of independence, since 1957
  - After almost 200 years as British colony
  - English language, many British traditions still prominent
Fact Sheet for Malaysia

Geographic coordinates: 2 30 N, 112 30 E

Area: 
- total: 329,750 sq km; land: 328,550 sq km; water: 1,200 sq km

Area - comparative: slightly larger than New Mexico

Land boundaries: 
- total: 2,669 km; border countries: Brunei 381 km, Indonesia 1,782 km, Thailand 506 km

Coastline: 
- 4,675 km (Peninsular Malaysia 2,068 km, East Malaysia 2,607 km)

Climate: 
- tropical; annual southwest (April to October) and northeast (October to February) monsoons

Natural resources: 
- tin, petroleum, timber, copper, iron ore, natural gas, bauxite

Land use: 
- arable land: 5.46%; permanent crops: 17.54%; other: 77% (2005)

Environment - international agreements:

Malaysia

- Upgrading its infrastructure, manufacturing & service sectors
- Government to turn the country into an education hub
- High growth in engineering degree programmes
- Demand for 200k engineers by 2010; presently ~ 120k
- Supply of 10k engineers per annum from local IHL
SOME MEGA PROJECTS

1) Trans-Peninsular Oil Pipeline  RM25 billion
2) Ipoh-Padang Besar Double-Track Railway  RM10 billion
3) Extension of Existing LRT Lines in Klang Valley  RM10 billion
4) 40km LRT Line with Underground Tunnel Across KL  RM10 billion
5) Bakun Undersea Cable  RM9 billion
6) High-Speed Train to Singapore  RM8 billion
7) Hulu Langat Water Treatment Project, Selangor  RM5 billion
8) Pahang-Selangor Inter-state Water Transfer  RM4 billion
9) West Coast Highway  RM3.05 billion
10) Penang Monorail  RM1.2 billion to RM1.6 billion
11) River Cleaning Project  RM1 billion

QUALIFICATION LEVELS & PATHWAYS

MIN HUMAN RESOURCE

ADV SKILLS DIPLOMA

SKILLS DIPLOMA

SKILLS CERT

SCHOOL CERT

COLLEGE U & UNI POLYTECH, CC & NON DEGREE GRANTING COLLEGES

ADV DIPLOMA

TECH & VOC DIPLOMA

TECH & VOC CERTIFICATE

LIFE LONG LEARNING

POSTGRAD CERT & DIPLOMA

GRADUATE CERT & DIPLOMA

UNIVERSITY

DOCTORAL

MASTERS

B. (HONS)

HIGHER SCHOOL CERT – 13 Yrs; FOUNDATION MATRICULATION

APEL Life long learning
Formation of Engineers in Malaysia, 1996.
Towards the Engineering Vision.

Educating Future Industry Leaders.

Malaysian Engineering Technologist and Engineering Technician, 2003
Blueprint for a highly competent engineering workforce

Future Direction for Engineering Education in Malaysia, 2006

UNESCO REPORT (2009)
Percentage of graduates from tertiary education graduating from Engineering, Manufacturing & Construction programmes
### THE BOARD OF ENGINEERS MALAYSIA: ROLES AND HISTORICAL BACKGROUND

Wen Hamidon, 2016

### THE EVOLUTION OF THE MALAYSIAN ENGINEERING ACCREDITATION BODIES IN MALAYSIA

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>Public Services Department (PSD) for admission to the Public Service</td>
</tr>
<tr>
<td>1959</td>
<td>Initiated by IEM modeled after UK and Australia</td>
</tr>
<tr>
<td>1967</td>
<td>BEM was established - joint accreditation with IEM</td>
</tr>
<tr>
<td>1996</td>
<td>LAN (National Accreditation Board) established to ensure quality of private institution of higher learning</td>
</tr>
<tr>
<td>2000</td>
<td>Establishment of the Engineering Accreditation Council (EAC) comprising of BEM, IEM, LAN and PSD</td>
</tr>
<tr>
<td>2007</td>
<td>Establishment of MQA (replacing LAN) as the Malaysia Qualification Agency</td>
</tr>
<tr>
<td>2008</td>
<td>EAC expanded to comprise BEM, IEM, MQA, PSD, Industry Representatives</td>
</tr>
<tr>
<td>2015</td>
<td>Establishment of the Engineering Technology Accreditation Council (ETAC) comprising of BEM, relevant learned societies, related Ministry, related government agency and industry employers of engineering technologists and technicians.</td>
</tr>
</tbody>
</table>
ACCREDITATION ROLE OF
THE BOARD OF ENGINEERS MALAYSIA (BEM)

• Malaysia Qualifications Agency Act 2007 and Registration of Engineers Act 1967 empowers BEM to conduct the accreditation of engineering programmes in Malaysia.

• Registration of Engineers Act 1967 (Revised 2015) has now included Engineering Technologist and Inspector of Works (Engineering Technician) under the legal power of the BEM in addition to the traditional professional engineering degrees.

• The Engineering Accreditation Council (EAC) is the body delegated by BEM for accreditation of professional engineering degrees.

• The Engineering Technology Accreditation Council (ETAC) is the body delegated by BEM for accreditation of engineering technology degrees and engineering and engineering technology diplomas.

• Only graduates registered with BEM can take up employment which requires him to perform professional engineering services (for Graduate Engineer or Engineering Technologist) and supervising engineering works (for Inspector of Works).

Wan Hamidon, 2018

Available online
at BEM website
(2) Notwithstanding subsections (1) and (1A) -

(a) a Graduate Engineer who is registered with the Board may, subject to section 8, take up employment which requires him to perform professional engineering services;

(aa) an Engineering Technologist who is registered with the Board may, subject to section 8, take up employment which requires him to perform professional engineering services;

(ab) an Inspector of Works who is registered with the Board may, subject to section 8, take up employment which requires him to assist the Professional Engineer in the supervision of engineering works; and

(b) a person who is a Professional Engineer by virtue of paragraph 10(2)(iii) as in force on the appointed date and who, on the 1st March, 1974, was not practising as an engineer in private practice shall not, at any time after that date, so practise unless –

(i) he holds a certificate from the Board that he has obtained a professional qualification approved by the Board; or

(ii) he is a Corporate Member of the Institution of Engineers (Malaysia).

**REA (1967) & its Regulations**

- **AMENDMENTS 2015**

**Registers 5 Categories of Registered Persons :**

(new in red)

1. Accredited Checker
2. Professional Engineer with Practising Certificate
3. Professional Engineer
4. Graduate Engineer
5. Engineering Technologist
6. Inspector of Works
BEM now regulates:

THE ENGINEERING TEAM

Accredited Checker
Professional Engineer with Practicing Certificate
Professional Engineer
Graduate Engineer
Engineering Technologist
Inspector of Works

PROFESSIONAL REGISTRATION UNDER BOARD OF ENGINEERS MALAYSIA

Engineering Technologist
Graduate Engineer
Professional Engineer
Professional Engineer with Practicing Certificate
Inspector of Works
Qualifications set by BEM
Sit & pass PA Examination
Sit & pass PC Examination
EAC/EAD VISION AND MISSION & STRUCTURE
EAC’s Vision & Mission

- **Vision:**
  To be a leading accreditation body in ensuring quality engineering education.

- **Mission:**
  To accredit engineering programmes.
  To conduct recognition of foreign engineering programmes.

BEM/EAC plays a very important role in enhancing the quality of engineering education in Malaysia through accreditation conditions benchmarked against world-class standard of the WA.

Constituents in Accreditation

- BOARD OF ENGINEERS MALAYSIA (BEM)
- PROFESSIONAL SOCIETIES (IEM)
- MALAYSIAN QUALIFICATIONS AGENCY (MQA)
- PUBLIC SERVICES DEPARTMENT (JPA)
- MAJOR INDUSTRY REPRESENTATIVES

DECIDE
- ENGINEERING ACCREDITATION COUNCIL (EAC)

RECOMMEND
- EAC EVALUATION PANEL

ENDORSE
- BOARD OF ENGINEERS MALAYSIA (BEM)
- ENGINEERING ACCREDITATION DEPARTMENT (EAD)

FACILITATE

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COUNCIL MEMBERS

1) Chairman (BEM)
2) Deputy Chairman (IEM)
3) 5 members (BEM)
4) 5 members (IEM)
5) 3 members from Major Industry
6) 1 member (MQA formerly LAN)
7) 1 member (JPA)

About 50:50 representation between academia & industry

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EVALUATION PANEL FOR ACCREDITATION

EAC Manual 2012 (Appendix A: Section 3.0) stated:

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

- a Chairperson who shall be a Professional Engineer or a Corporate Member of Learned Bodies; 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.
- Preferably, all members of the Evaluation Panel shall be professional engineers.

Wan Hamidon, 2016
EAD ORGANISATIONAL STRUCTURE

DIRECTOR
Prof. Dato’ Ir. Dr. Wan Hamidon Wan Badruzzaman

ASSOCIATE DIRECTORS
In. Prof. Megat Johari Megat Mohd Noor (International Resource Person)
In. Prof. Dr. Ramesh Singh (Manufacturing & Materials Engineering)
Prof. Nor Zamriah Noradlin (Electrical Engineering)
In. Liew Chia Rong (Electronic Engineering)
In. Prof. Dr. Siti Hawa Hamzah (Civil Engineering)
In. Professor Dr. Abdul Aziz Abdul Raman (Chemical Engineering)
In. Hasni Hasni (Mechanical Engineering)

MANAGER
SENIOR ADMIN. OFFICER (Accreditation)
Mrs. Norhamiza Mohd Noor

ADMIN. OFFICER (Admin. & Finance)
Mrs. Nor Hasniza Arshad

ADMIN. ASSISTANT OFFICER (IT)
Mrs. Nor Affira Mohd Jelal

ADMIN. ASSISTANT (Accreditation)
Vacant

ADMIN. ASSISTANT (Admin. & Finance)
Mr. Mohd Nazaran Ab Malik

TERMS OF REFERENCE FOR THE ASSOCIATE DIRECTORS

- Review and edit all the cluster/group panel programme assessment/accreditation reports.
- Provide the expert advice to cluster/group in moderating and finalising the programme assessment/accreditation reports.
- Provide expert advice and opinion whenever required on the subject matter and engineering discipline assigned.
- Assist the EAD Director in the development and improvement of the accreditation processes.
- To be the key resource person for the training and development of panels of assessors.
- Participate in strategic planning for the EAC/EAD.
- Join in accreditation visits to conduct on-site moderation/advisory/mentoring of evaluation panel members.
- Attend EAD meetings.
- Involve in Manual review.
- Perform any other tasks assigned by the EAD Director.

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## ACCREDITATION DATA UPDATES

Wan Hamidon, 2016

### LIST OF DISCIPLINE OF ENGINEERING PROGRAMMES
as at 29th March 2016

<table>
<thead>
<tr>
<th>No.</th>
<th>Public University</th>
<th>No of Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UTAM</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>UTM, Penang</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>UTM, S A</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>UKM</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>UM</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>UMP (KUKTEM)</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>UMS</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>UNIMAP (KUKUM)</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>UNIMAS</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>UPM</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>UPM (ATMA)</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>USM, Penang</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>UTEM (KUTKM)</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>UTHM</td>
<td>8</td>
</tr>
<tr>
<td>15</td>
<td>UTM</td>
<td>35</td>
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<tr>
<td></td>
<td>Total</td>
<td>188</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Private University</th>
<th>No of Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AIMST University</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>APU (UCTI)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>CURTIN</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>INTI University</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>IUKL/KLUC</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>KBU</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>KDU, Penang Campus</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>KDU, Utropolis Glenmarie</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>KOLEJUNIITI</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>MJIT, UTM</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>MMU, Cyberjaya</td>
<td>8</td>
</tr>
<tr>
<td>12</td>
<td>MMU, Melaka</td>
<td>6</td>
</tr>
<tr>
<td>13</td>
<td>MONASH</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>NILAI UC</td>
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<tr>
<td>15</td>
<td>PRIME/UPM</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>SEGI UC</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>SWINBURNE</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>TAM/UTM</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Taylor's University</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>UCSI University</td>
<td>7</td>
</tr>
<tr>
<td>21</td>
<td>UNIM</td>
<td>10</td>
</tr>
<tr>
<td>22</td>
<td>UNISEL</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>UNITEN</td>
<td>4</td>
</tr>
<tr>
<td>24</td>
<td>UTAR, KL</td>
<td>9</td>
</tr>
<tr>
<td>25</td>
<td>UTAR, Perak</td>
<td>4</td>
</tr>
<tr>
<td>26</td>
<td>UTP</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>188</td>
</tr>
</tbody>
</table>
## List of Discipline of Engineering Programmes Accredited

as at 29th March 2016

<table>
<thead>
<tr>
<th>No</th>
<th>Discipline</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electrical</td>
<td>29</td>
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<tr>
<td>2</td>
<td>Electronic</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>Mechatronic</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Civil</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>Mechanical</td>
<td>49</td>
</tr>
<tr>
<td>6</td>
<td>Chemical</td>
<td>31</td>
</tr>
<tr>
<td>7</td>
<td>Computer</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Petroleum</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Mineral Resources</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Material</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Polymer</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Aerospace</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>Manufacturing</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>Microelectronic</td>
<td>1</td>
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<tr>
<td>15</td>
<td>Telecommunication</td>
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<td>17</td>
<td>CAD/M</td>
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<td>18</td>
<td>Environmental</td>
<td>3</td>
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<td>19</td>
<td>Food &amp; Process</td>
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<tr>
<td>20</td>
<td>Biological &amp; Agricultural</td>
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<tr>
<td>21</td>
<td>Communication</td>
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<td>25</td>
<td>Naval Architecture</td>
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<tr>
<td></td>
<td>Grand Total</td>
<td>294</td>
</tr>
</tbody>
</table>

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## Analysis on Accreditation Year Accorded for Engineering Programmes 2009 – 2015 (3rd November 2015)

<table>
<thead>
<tr>
<th>Year</th>
<th>Accreditation Year Accorded/Programme</th>
<th>Total Accredited Programme</th>
<th>Total IHL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Year</td>
<td>2 Years</td>
<td>3 Years</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>64</td>
<td>13</td>
</tr>
<tr>
<td>2009</td>
<td>7</td>
<td>69</td>
<td>11</td>
</tr>
<tr>
<td>2010</td>
<td>9</td>
<td>89</td>
<td>19</td>
</tr>
<tr>
<td>2011</td>
<td>1</td>
<td>76</td>
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<tr>
<td>2012</td>
<td>26</td>
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<tr>
<td>2013</td>
<td>18</td>
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<tr>
<td>2014</td>
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<td>30</td>
<td>47</td>
</tr>
<tr>
<td>2015</td>
<td>4</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>2016</td>
<td>0</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

Wan Hamidon, 2016
EAC APPROACH TO ACCREDITATION

- Fully prescriptive with qualitative assessment
  - Program structure
  - Program content
  - Assessment
  - Operating environment
  - Quality process

- Direct monitoring of outcomes
  - Assessment of individual graduate capabilities

Engineering Accreditation Council (EAC) Malaysia

- Accreditation criteria includes inputs, process and content to assess the attainment of outcomes
- Anticipates a systematic, ‘top-down’ approach to educational design, review and improvement
- Encourages diversity and innovation
- Still maintaining some prescriptive nature

Wan Hamidon, 2016
EAC v3 (ed. 1) MANUAL 2006
(towards WA full membership)
SHIFTED TOWARDS AN OUTCOME-BASED ACCREDITATION
(1st version fully embracing Outcomes-Based Education (OBE))

Wan Hamidon, 2016
EAC Shift in Accreditation Philosophy and Approach introduced in EAC Manual 2006

• The focus of EAC accreditation system has been shifted from a prescriptive based to an outcome-based approach.

• However, input and process are still important.

• A balanced judgement on the potential for a programme to deliver graduates with an appropriate level of attainment of the generic attributes can then be made.

Wan Hamidon, 2016

EAC Manual Table of Contents

Definitions
1. Introduction
2. Accreditation Objective
3. Programme Objectives
4. Programme Outcomes
5. Accreditation Policy
6. Accreditation Procedure
7. Qualifying Requirements & Accreditation Criteria
8. Accreditation Documents
9. Approval Procedure for a New Engineering Programme

Appendix A – Appendix G.
Section GL

Wan Hamidon, 2016
EAC Ver. 3 Manual Development

Ver. 3 (ed. 1) 2006
- Introduced a new Section 3.0: Programme Objectives (PEOs).
- Introduced new Section 4.0: 10 Programme Outcomes (POs) similar to EAC v1 & v2 Manual ‘The Generic Attributes of a Graduate’
- Revamped Evaluation Panel Report Form (Appendix D) – Still maintaining a very prescriptive marks based evaluation & accreditation decision.
- Reinforced all accreditation Criteria requirements including Appendices.
- Reinforced visit schedule – meeting with stakeholders made compulsory.

Ver. 3 (ed. 2) 2007
- Re-writing and fine tuning sections of the Manual.
- Removed the marks based evaluation & accreditation decision in Appendix D. Made the evaluation more qualitative and based on professional judgement.
- Moved template for tables of IHL submission from Appendix C to Appendix G.

Ver. 3 (ed. 3) 2012
- Introduced new 12 POs adopted verbatim from IEA/IA Graduate Attributes and Professional Competencies (Version 2.2008 Kyoto).
  - Complex Problem Solving (CPS)
  - Complex Engineering Activities (CEA)
  - Knowledge Profile
- Introduced Compulsory Design Projects (Capstone/IDP).
- New condition - Industrial training must be conducted before the final semester.
- New Condition for Passing Courses
- New Staff : Students Ratio >>> 1 : 20 (previously 1 : 25)

Wan Hamidon, 2016

EAC Ver. 3 (draft ed. 4) 2016

Ver. 3 (draft ed. 4) 2015 to be launched 2016 after stakeholders consultation workshop

Refined Section 3.0: Programme Outcomes (POs) Adopted the latest 2013 WA requirements based on IEA Graduate Attributes and Professional Competencies (Version 3 2013 Seoul) paper. Refer to EAC circular.

Revised Section 8 (attached): Accreditation Documents/SAR guidelines.

Revised Appendix C (attached): Checklist Checklist of Documents for Accreditation*/Approval of New Programme** and Relevant Information.

Revised Section 6.1 (attached): Application for Accreditation/IHL Submission Guidelines.

Wan Hamidon, 2016
These policies and guidelines are to reinforce the EAC Manual requirements

Revised Policy on Minimum 3 Professional Engineer Requirements per programme by 2015 (attached) – setting the deadline to end of 2015, and the acceptance of professional qualifications from APEC and IPEA countries (circular sent out to all IHL on 9th April 2015).

New Policy on Change of Programme Name.

New Policy of Programme Naming.

Determining Accreditation Decision Paper, V2/2015.


Draft Revised Accreditation Management System (AMS), V2/2015.

Wan Hamidon, 2016
PEOs and POs + 5 ACCREDITATION CRITERIA

Rubrics for Awarding Accreditation (new, new-cycle, continuing, interim programmes)

<table>
<thead>
<tr>
<th></th>
<th>5 years</th>
<th>5 years + interim report within 3 years</th>
<th>3 years</th>
<th>2 years</th>
<th>1 year</th>
<th>0 year</th>
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<tr>
<td>Major concerns</td>
<td>×</td>
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<td>× 1 2</td>
<td>× 1 2</td>
<td>× 1 2 3</td>
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<td>Minor concerns</td>
<td>×</td>
<td>≤ 2</td>
<td>× 1 2</td>
<td>× 1 2</td>
<td>× 1 2 3</td>
<td>× 1 2 3 4</td>
</tr>
</tbody>
</table>

5 or 6 major concerns or any weakness

<table>
<thead>
<tr>
<th>Balance of years</th>
<th>Balance of years -1 year</th>
<th>Balance of years - 2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>All concerns CLOSED</td>
<td>≤ 2 concerns not CLOSED</td>
<td>&gt; 2 concerns not CLOSED</td>
</tr>
</tbody>
</table>
STRENGTHS

- Strengths can be defined as anything with a ‘wow factor’ of ‘very outstanding nature’ far beyond just satisfying the minimum requirements.

WEAKNESSES

- ANY of the eight (8) Qualifying Requirements not fulfilled.
- Transgressed any Accreditation Criteria to the point of TOTAL COLLAPSE.
- Programme has no breadth and depth of an engineering education.
- OBE is not implemented.
- Repeated Major Concerns can be upgraded to Weaknesses.

CONCERNS

- Any shortfalls/shortcomings or transgression of but not amounting to ‘total collapse’ of any of the accreditation criteria.
- Major or Minor concerns depend on their seriousness and impact on the accreditation criteria.
  - MAJOR CONCERNS
    - High or significant impact level.
  - MINOR CONCERNS
    - Low or less significant impact level.
- Repeated OFIs can be upgraded to minor concerns.
- Repeated minor concerns can be upgraded to major concerns.
OPPORTUNITIES FOR IMPROVEMENT

Opportunities for Improvement (OFI) refer to ‘good to have’ or ‘desirables’ recommendations made by the Evaluation Panels for programme Continual Quality Improvement (CQI). OFI do not affect accreditation decision in the first round of accreditation when these OFI are listed. However, if programme failed to act upon these OFI in the next round of accreditation, it will be taken as going against the spirit of Continual Quality Improvement (CQI), and may be turned from OFI into concerns.

INTERNATIONAL ENGINEERING ALLIANCE (IEA) AND IEA GRADUATE ATTRIBUTES & PROFESSIONAL COMPETENCIES

http://www.ieagreements.org
IEA EDUCATIONAL ACCORDS
IEA Educational Accords
Distinguishing Factors

Washington Accord
- Engineering Education.
- Professional engineering graduates are expected to work with complex engineering problems.

Sydney Accord
- Engineering Technologist or Incorporated Engineers.
- Technologist graduate with broadly-defined engineering problems.

Dublin Accord
- Engineering Technicians.
- Technician graduate to work with well-defined engineering problems.

Distinguishing Factors

WASHINGTON ACCORD
- Professional engineering graduates are expected to work with complex engineering problems.

SYDNEY ACCORD
- Technologist graduate with broadly-defined engineering problems.

DUBLIN ACCORD
- Technician graduate to work with well-defined engineering problems.

Wan Hamidon, 2016
Ruling for Admission

Provisional members: Must be accepted by two-thirds majority for all accords *(Washington, Sydney and Dublin Accords)*

Full signatory members: Must be accepted by two-thirds majority for Sydney and Dublin Accords but must be accepted unanimously by all members for Washington Accord

Development of International Engineering Alliance

- WA signed by 6 organisations
- Development of formal peer review processes
- New Accords and Agreements
- Development of graduate attribute exemplars

- 28 Sep 1989
- 1990s onwards
- 1997-2002
- 2001 onwards

IEA Established in 2007
Defining standards of education and professional competence.

IEA Graduate Attributes and Professional Competencies:

Version 1: June 2005
Version 2: June 2009
Version 3: June 2013
(http://www.ieagreements.org/)

This relates to the EAC’s 12 Programme Outcomes (POs)

Compliance “Terminologies”

- Graduate Attributes (WA/SA/DA)
- Range of Problem Solving (WP/SP/DP)
- Range of Engineering Activities (EA/TA/NA)
- Knowledge Profile (WK/SK/DK)
Graduate Attribute Profiles

<table>
<thead>
<tr>
<th>WA1</th>
<th>Engineering Knowledge</th>
<th>Breadth &amp; depth of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA2</td>
<td>Problem Analysis</td>
<td>Complexity of analysis</td>
</tr>
<tr>
<td>WA3</td>
<td>Design/Development of Solutions</td>
<td>Breadth &amp; uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified and coded</td>
</tr>
<tr>
<td>WA4</td>
<td>Investigation</td>
<td>Breadth &amp; depth of investigation and experimentation</td>
</tr>
<tr>
<td>WA5</td>
<td>Modern Tool Usage</td>
<td>Level of understanding of the appropriateness of the tool</td>
</tr>
<tr>
<td>WA6</td>
<td>The Engineer and Society</td>
<td>Level of knowledge and responsibility</td>
</tr>
<tr>
<td>WA7</td>
<td>Environment and Sustainability</td>
<td>Type of solutions</td>
</tr>
<tr>
<td>WA8</td>
<td>Ethics</td>
<td>Understanding and level of practice</td>
</tr>
<tr>
<td>WA9</td>
<td>Individual and Team Work</td>
<td>Role in and diversity of team</td>
</tr>
<tr>
<td>WA10</td>
<td>Communication</td>
<td>Level of communication according to type of activities performed</td>
</tr>
<tr>
<td>WA11</td>
<td>Project Management and Finance</td>
<td>Level of management required for differing types of activity</td>
</tr>
<tr>
<td>WA12</td>
<td>Life-long Learning</td>
<td>Preparation for and depth of continuing learning</td>
</tr>
</tbody>
</table>

Wan Hamidon, 2016
Washington Accord

An International Partnership

- Recognizes the “substantial equivalency” of an accreditation system within a country – that assesses/assures that the graduates of accredited programmes in their country are adequately prepared to practice engineering at the entry level of the profession in any of the signatory countries.

- Established in 1989
- 6 years peer review cycle

Wan Hamidon, 2016

Washington Accord is one of the drivers for Quality Improvement of Engineering Education and International Process Benchmarking
Objectives

1. Introduction to the Washington Accord and its future development

2. What are the WA Graduate Attributes?

3. What are the WA's expectations of the signatories with regard to the Graduate Attributes and Other Requirements?

4. Why accreditation team leaders of the signatories should have understanding of the WA Graduate Attributes?
What is Professional Competence?

- Professional Engineers are able to perform functions because of their:
  - Knowledge,
  - Skills, and
  - Attitudes

- Competence is developed by
  - Education,
  - Training, and
  - Experience

The Washington Accord Agreement recognises that: “Accreditation of engineering academic programs is a key foundation for the practice of engineering at the professional level in each of the countries or territories covered by the Accord.”
History of the Washington Accord

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Signatories: UK, Ireland, USA Canada, Australia, New Zealand</td>
<td>Hong Kong, South Africa, Japan, Singapore</td>
<td>Chinese Taipei, Korea, Malaysia, Turkey, Russia, India, Sri Lanka</td>
</tr>
</tbody>
</table>

- Original Rules and Procedures
  - 2007 Educational Accords Rules and Procedures
  - 2011 Educational Accords Rules and Procedures

- Substantial Equivalence of Accreditation Criteria
  - 2001-2005: Developing the Graduate Attributes (GA)
  - 2007: GA are exemplars
  - 2011: GA to become standards

- WA Secretariat Provided by a Volunteer Singnatory
  - 2007 International Engineering Alliance Secretariat

---

Washington Accord: Status in Accord

- **Signatory**: A body entitled to fully participate in the Accord, enjoys the same rights and obligations as all other signatories.

  The body must be:

  - independent of the academic institutions delivering accredited or recognised programmes within their jurisdiction.

  - An authority, agency or institution representative of the engineering profession that has legal or recognised authority to accredit programmes.

- **Provisional Status**: A body that has demonstrated that it has an accreditation / recognition system conceptually similar to signatories – Has none for the rights or duties of signatories.
Washington Accord: Mutual Recognition

Agreement states:

- Accreditation criteria, policies and procedures of the signatories have been verified comparable.
- Accreditation decisions made by one signatory are acceptable to the other signatories.
- Recognition applies only to accreditations conducted within the signatory’s national or territorial boundaries, except:
  - Offshore programmes offered by university with programmes accredited in home territory
  - A designated signatory accredits in a developing countries where there is no capacity to operate an accrediting body.

Basis for Recognition Substantial Equivalence

Definition in Graduate Attributes:

Substantial equivalence: applied to educational programmes means that two programmes, while not meeting a single set of criteria are both acceptable as preparing their respective graduates to enter formative development toward registration.

**Washington Accord: Benchmarking**

Agreement states:

- The Signatories will identify and encourage the implementation of best practice for the academic preparation of engineers
  - by mutual monitoring
  - regular communication and sharing of information:
    * accreditation criteria, systems, procedures, manuals, publications
    * lists of accredited programmes;
- invitations to observe accreditation visits; and invitations to observe meetings of any boards
- Regular monitoring through six-yearly visits now required

**Washington Accord: Provisional Status**

- Application for Signatory Status will be preceded by a prescribed period of Provisional Status.
- Applicants for provisional status must be nominated by two signatories, (who have usually mentored the applicant).
- Acceptance as provisional by a two-thirds majority of signatories.
- Admission requires that the body has an accreditation system.
- Substantial equivalence is not required for provisional status: the provisional may need to develop criteria, policies and procedures.
- Mentoring continues during provisional status.
Washington Accord: Becoming a Signatory

- Normal minimum period as provisional is two years
- A provisional that is ready to apply for signatory status requests a verification visit
- Application must be supported by two signatories
- Visit takes place
- Visit must demonstrate substantial equivalence of:
  - Accreditation standard to the Graduate Attributes
  - Policies and processes to be substantially equivalent
- Visit report is considered at a general meeting
- Admission of a new signatory requires unanimous approval

Duties of Signatories

- Attend General Meetings of the Washington Accord
- Receive a review visit every six years
- Provide Evaluators for:
  - Reviews of other signatories
  - Verification visits to provisionals applying to be signatory
- Mentor new applicants and provisionals
- Make list of accredited programmes available
- Publish a clear statement of programmes that it recognises
- When registering body is separate, make every effort to ensure that registering body recognises signatories’ programmes.
3. What are the WA's expectations of the signatories with regard to the Graduate Attributes and Other Requirements

- Conformity to own EAC’s published accreditation policies and procedures.
- To confirm whether the standard of the graduates of accredited / recognised programmes are substantially equivalent to graduates of other Accord signatories, which would normally be determined by:
  - consideration by the reviewers as to whether they consider that the accreditation standard is substantially equivalent to those in their home jurisdictions, and
  - a collective judgement by the Team as a whole as to whether the accreditation standard is substantially equivalent to that of the Accord as illustrated by the exemplar graduate attributes of the relevant Accord.

4. Why accreditation team leaders of the signatories should have understanding of the WA Graduate Attributes?

- To be discussed
Substantial Equivalency

The substantial equivalency has evolved from broad judgements to currently a formalised approach with Graduate Attributes exemplar standards, defined procedures implemented in robust reviews (IEA 2015). Determined as per Clause 5.1.9g of the Accord Rules and Procedures (IEA 2015) that stated that standard of the graduates of accredited/recognised programmes are determined by:

- consideration by the reviewers as to whether they consider that the accreditation standard is substantially equivalent to those in their home jurisdictions, and
- a collective judgement by the Team as a whole as to whether the accreditation standard is substantially equivalent to that of the Accord as illustrated by the exemplar graduate attributes of the relevant Accord.

Wan Hamidon, 2016

MALAYSIA’S JOURNEY FROM PROVISIONAL TO FULL WA SIGNATORY STATUS (2003 – 2009)

Wan Hamidon, 2016
2003: WA Provisional member

2009: WA Full signatory status

6 years journey
A difficult and tough one!

Pre-Washington Accord Visits (2002 - 2009)

- Sponsor (UiTM, UIA)
- 1st Mentor (MMU, UKM)
- 2nd Mentor (UTeM, UTM)
- 3rd Mentor (UNIMAP, UTP)
- 4th Mentor (KLIUC, UNITEN) & (ADM)
- 5th Mentor (UiTM) & (ADM)
- 1a Reviewer (UPM, UKM)
- 1b Reviewer (ADM)

UK & Australia

Prof Bradley (Aus)
Prof Brisk (Aus)
Prof Fletcher (US)
Dr Alex Chan (HK)

Prof Hodgson (NZ)
Prof Honjo (Jap)
Prof Glennon (Ire)

2015
- 2a Reviewer (UM, Monash)
- 2b Reviewer (ADM)

WA 2016 - 2022

Prof Yen (Ty)
Prof P. Daniels (US)
Sy Ghourrah (SA)
MALAYSIA’S REVIEW OF WA FULL SIGNATORY STATUS (2015)

Malaysia’s WA Review

- Malaysia became a full signatory of WA in 2009.
- Reviewer Team:
  - ECSA (South Africa)
  - ABET (USA)
  - IEET (Chinese Taipei)
- Decision made at IEA Meeting in Malaysia 2016.
RECOMMENDATION TO SIGNATORIES

- The Washington Accord monitoring team that visited Board of Engineers Malaysia recommends that “The Board of Engineers Malaysia is accepted by the other signatories, for a period of six years, as leading to outcomes substantially equivalent to those recognised by the Accord

Wan Hamidon, 2016

The recommendation of the monitoring team is based on evidence collected during the observation visits to BEM, including the briefing by the BEM/EAD officials, the meeting with the EAC members, the observations of two accreditation visits, and the observation of the EAC decision meetings. The reasons for the recommendations are based on the following:

- Well documented accreditation criteria and accreditation procedures.
- Comprehensive pre-visit documentation for the preparation of the Self-Evaluation Reports.
- Well trained programme evaluators who are familiar with the evaluation tools and are rigorous at following the evaluation process.
- Very knowledgeable EAD officials to direct the accreditation process.
- Well-structured accreditation procedure to ensure consistency.

The EAD had been continuously updating their accreditation documentation. The last update to comply with the 2011 Washington Accord graduate attributes was in 2012.

Wan Hamidon, 2016
Key Success Factors

1. Highest level of support and commitment from the Malaysian government and agencies, and other stakeholders towards the adoption of the OBE implementation.
2. Reinforced OBE as the main driver of education and accreditation.
3. WA mentoring team guidance strictly adhered to.
4. Conducted visits to other signatories to adopt/adapt best practices – e.g. ECSA (South Africa), ABET (USA), IPENZ (New Zealand), IEET (Taiwan), Engineers Australia (Australia).
5. Continuous improvement of the accreditation manual.
6. Improved EAD organisation structure – introduced 7 Associate Directors (ADs) or cluster heads (experts).

Key Success Factors

7. Continuous engagement and dialogues with the various stakeholders.
8. Inculcate cultural change within the IHLs environment – academic staff appointed as Evaluation Panels and ADs, and provided training on accreditation requirements for IHLs.
9. Regular training conducted for Evaluation Panel Members (EPM): Senior EPM, Existing EPM, New EPM.
10. Continuous revision and improvement of the Accreditation Management System.
11. Improved accreditation decision making process (3 ADMs per year) + decision criteria (decision rubrics), and EAC Council training.
12. Continuous support, cooperation, and guidance provided by the IEA’s secretariat and signatories.
Conclusions

• Accreditation process must be regarded as a partnership of all stakeholders involved – BEM, IEM, MQA, PSD, IHL, etc.
• EAC appreciate very much the role of Evaluation Panel Members which primarily come from IHL and they should be similarly recognised by the IHL.
• Upgrading the quality of engineering education will place our IHL for international recognition.

WAY FORWARD FOR BAETE
Please refer to Accord Rules and Procedures (3rd June 2016 version)


Wan Hamidon, 2018

WA Review Checklist

EAD
- Prepare “WA Review Plan”
- Review BAETE Accreditation Process & Document
- Prepare the 2015 Accreditation list
- Identify IHLs for the Review visit
- Confirm & Request for the IEA-WA Reviewers
- Reflect on the previous WA mentoring reports
- Arrange the Review visits of the selected IHLs
- Prepare selected IHLs to receive the visit
- Prepare a SAR for the WA reviewer

EAC Evaluators
- Plan & Conduct the Accreditation (Review) Visits
- Write Accreditation report & respond to factual inaccuracies/corrective actions
- Participate in Pre-ADM (Decision meeting)

EAC
- Conduct ADM in the “presence” of the IEA-WA Reviewer
- Respond to IEA-WA Mentoring report

WA
- Submit Review Report to IEA-WA 120 days before IEAM
- Circulate Review Report to all signatories by March
- Table Review Report at the June IEAM
Accreditation Evaluation Panels
Requirements

- Well verse and adhere to strictly all accreditation criteria in the Manual.
- Clearly focusing on:
  - OBE and 12 Graduate Attributes.
    - Complex Problem Solving.
    - Complex Engineering Activities.
    - Knowledge Profile.
  - Breadth & Depth to differentiate engineering education from training of engineering technologists.
  - Programme and course levels Continual Quality Improvement (CQI).
- Evaluators’ conduct/etiquettes and professionalism.
  - Probing questions (not interrogative).
  - Avoid bean counting – go for significant few and not trivial many.
  - Avoid fault finding.
  - Matured discussion level.
  - Time keeping.
  - Avoid conflict of interest.
- Clarity of reports.

MENTORING

- A process by which an appointed mentoring team provides support and guidance to an accreditation/ recognition body that wishes to apply for provisional status or to become a signatory to one or more of the Accords. The mentoring role will focus on providing advice and guidance on the accreditation/ recognition policies and procedures and education standards of the mentee so that the mentee is given every opportunity, on application, to gain provisional status or become a signatory of the relevant Accord.

Wan Hamidon, 2018
Prepare the Road-Map

MOVING FORWARD: GENERAL ISSUES, CONCERNS & CHALLENGES
Issues, Concerns & Challenges

1. Stakeholders Issues

- Ensuring the quality of the engineering education and the student outcomes that continually meet the market demand to result in more sustainable employability of graduates in the engineering domain - continuous engagement between corporate sectors and IHLs for programme improvements.

- Ensuring the highest standard of teaching staff at IHL - adequacy test / accreditation of the teaching staff.

- Competency and skill / professional training for graduates - industry engagement and involvement, a partnership arrangement in education.

2. Benchmarking & CQI

- The convergence of recognition (expected graduate outcomes): e.g. IEA - EUR ACE (FEANI).

- Education philosophy and approach.
  - Evolution of education philosophy for the future - is OBE the final answer or Time based education vs depth / breadth of content.
  - basic fundamentals vs specialisation for graduate programme.

- IHL/industry partnership in engineering education: Tenaga Nasional Bhd. / UNITEN, Petronas / UTP, Telekom Malaysia Bhd. / MMU.
Issues, Concerns & Challenges

3. Trust & Integrity

- Bridging the gaps between private and public IHLs governing /driving forces:
  - Private IHLs: govern by the need for commercial & profitability.
  - Public IHLs: driven by the political & national interest needs of nation.
    - Maximum government and minimum governance.

CLOSING REMARKS
Closing Remarks

- Accreditation process must be regarded as a partnership of all stakeholders involved - buying in is very important.
- The established system must be able to push for sustainable results.
- Upgrading the quality of engineering education will place our IHL for international recognition.
Acknowledgement

- IEA Graduate Attributes and Professional Competencies (http://www.ieagreements.org)
- IEA presentation materials
- WA mentoring team presentation materials
- Prof. Hu Hanrahan
- Prof. Ir. Megat Johari Megat Mohd Noor
- Prof. Ir. Dato’ Dr. Hassan Basri
- All who have contributed

THANK YOU