



# An Overview of Engineering Technologist and Engineering Technicians in Malaysia

Presented by  
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Chairman of the Engineering Technology Accreditation Council  
(ETAC)

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Venue: Board of Engineers Malaysia via ZOOM

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## Outcomes of the Presentation

- ❖ **The difference between Engineering Technologist and Engineering Technicians (ETT)**
  - Engineering and Engineering Team (Engineers Vs Technologist Vs Technicians (IOW))
  - Their work scope and examples of career path
- ❖ **How to become an ETT**
  - Academic and Professional pathways
  - ETAC (Engineering Technology Accreditation Council)
- ❖ **Mobility**
  - Where to work as an ETT
  - IEA ( International Engineering Alliance), AFEO (ASEAN Federation of Engineering Organisation)
  - IETA, AIET

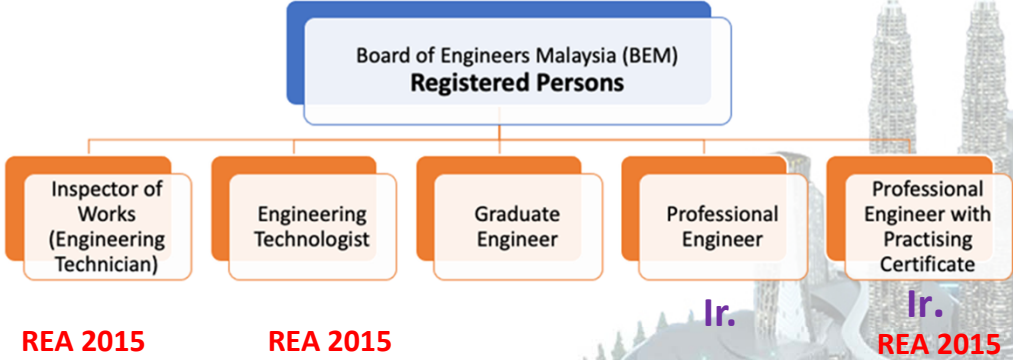
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## Introduction

### ENGINEERING AND THE ENGINEERING TEAM



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## Introduction

### Why do we need the registration of Engineers Act ?

The purpose of the Act is :


**To protect the public by legislative control so that the practice of engineering, which has a bearing on public safety, health and welfare, can only be carried out by licensed professional engineers, Engineering Technologist and Engineering Technicians (IOW)**

**The Board of Engineers Malaysia (BEM)** is a statutory body constituted under the Registration of Engineers Act 1967. Its primary role is to regulate the practice of engineering under the Act.




Regulator

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## Introduction



**Why the need for amendments?**

The amended REA will be known as "Registration of Engineers Act 1967 (Revised 2015)", whilst the accompanying Regulations will be known as "Registration of Engineers Regulations 1990 (Revised 2015)". The Regulations are meant to supplement the Act in the day-to-day affairs, operations and functions of the Board of Engineers (Board).

These latest amendments are a direct result of Government policies on trade for services. As Malaysia developed towards a service industry the issue of "liberalisation" of the services came to the forefront in the Free Trade Agreements (FTA) which the country signed. These latest amendments directly address liberalisation issues in order for the country to meet its international obligations.

**6.0 New Categories of Registered Persons**


Section 10 of the REA was amended to include new sections namely Sections 10C, 10D and 10E to provide for the registration of Engineering Technologist, Professional Engineer with a Practising Certificate and Inspector of Works as shown in Figure 1.

Mobility


So that the new categories of registered persons can be regulated and recognised to enable mobility due to recognition by international bodies.

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## Introduction




In 2015 the Registration of Engineers Act (REA) (1967) was amended to include the registration of

- 1) **Engineering Technologist** and
- 2) **Engineering Technicians** (referred to as Inspector of Works in the Act (IOW)).
- 3) Professional Engineer with a Practising Certificate (PEPC)

This is in addition to the registration of **Engineers, (1967)** thus completing the spectrum of engineering professions, as Registered Persons under the Act.

LAW OF MALAYSIA      ACT 128



**REGISTRATION OF ENGINEERS ACT 1967**  
(Incorporating amendments up to 2015)


LEMBAGA JURUTERA MALAYSIA  
BOARD OF ENGINEERS MALAYSIA

Registration of Engineers Act (REA) (1967)


<http://bem.org.my/registration-of-engineers-act-1967-revised-2015->

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## Introduction



### PART III – REGISTRATION OF ENGINEERS

#### Inspector of Works, Engineering Technologist & Graduate Engineers


### Section 7(2). - New Section

Not withstanding subsections (1) and (1A) –

- (a) a Graduate Engineer may, subject to section 8, take-up employment which requires him to perform professional engineering services;
- (aa) an Engineering Technologist may, subject to section 8, take-up employment which requires him to perform professional engineering services;
- (ab) an Inspector of Works may, subject to section 8, shall register with the Board to take-up employment which requires him to assist the Professional Engineer in the supervision of engineering works;

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## Introduction

## INTERPRETATION

**Registration of Engineers Act 1967 (Revised 2015):**

**Section 7(2) (aa) of Registration of Engineers Act 1967 (Revised 2015)**

“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**”

**Section 7(2)(ab)**

“an Inspector of Works (IOW) 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**”.

**Section 2**

“Professional Engineering Services means **engineering services and advice in connection with any feasibility study, planning, survey, design, construction, commissioning, operation, maintenance and management of engineering works or projects and includes any other engineering services approved by the Board.**”

“Engineering works means **all works which include any publicly or privately owned public utilities, buildings, machines, equipment, processes, works or projects that require the application of engineering principles and data.**”

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## ENGINEERING TECHNICIAN VS IOW

### What is the difference between IOW and Engineering Technician?

- In view of the recognition that “engineering” covers a wide spectrum of persons from engineers to engineering technicians; the Board has decided to register unregulated “engineering technicians” in the engineering industry.
- IOW is a new professional profession introduced in 2015 under RE
- IOW is not exclusively work for consultants supervising construction works under supervision of PE/PEPC.
- Engineering Technicians (which includes IOW) generally refers to graduates with Diploma in Engineering or Engineering Technology
- Minimum qualification for registration as IOW is a recognised or accredited Diploma in Engineering or Engineering Technology.
- Fresh grads from diploma holder may register as IOW (intern) while gaining experience before applying to register as IOW.

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## BOARD OF ENGINEERS MALAYSIA (BEM)

- ❑ The regulatory body for engineering practices in Malaysia; set-up by the Malaysian government under the Registration of Engineers Act, 1967 (REA) to administer and to enforce the REA and its provisions to protect public interest;
- ❑ Only Graduate Engineers, Engineering Technologist, Inspectors of Work and Professional Engineers registered with the Board of Engineers, Malaysia (BEM) are allowed to practice engineering in Malaysia;
- ❑ All engineering practitioner **MUST** register with the BEM of practice.

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## Introduction

### What is Engineering

- Engineering works is defined in the REA Act as all **works which include any publicly or privately owned public utilities, buildings, machines, equipment, processes, works or projects that requires the application of engineering principles and data.**
- Engineering is involved in the optimum conversion of natural resources for the benefit of mankind through design, building and maintenance of machines and structures. **The scope of engineering services or engineering works** encompass the entire product life cycle that includes research, complex analysis, complex design, development, product design, testing & evaluation, manufacturing, operations, service & maintenance and distribution & sales



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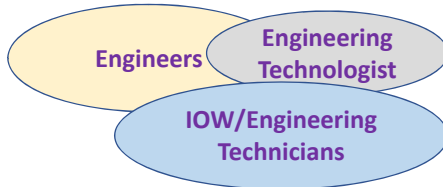
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## ENGINEERING AND THE ENGINEERING TEAM




**Definition in the REA Act:** Engineering works include any publicly or privately owned public utilities, buildings, machines, equipment, processes, works or projects that requires the application of engineering principles and data.



Engineering team performs engineering services or works and in many cases there are overlapping of functions.

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## CAREERS IN ENGINEERING

### CASE STUDY: CONSTRUCTION INDUSTRY

Engineers

Engineering Technologist

Engineering Technicians

RESEARCH & FEASIBILITY STUDY

CONCEPTUAL DESIGN

DETAILED DESIGN

IMPLEMENTATION PLANNING

CONSTRUCTION AND QUALITY CONTROL

COMMISSIONING AND TESTINGS

OPERATIONS

PREVENTIVE MAINTENANCE

CORRECTIVE MAINTENANCE


DECOMMISSION

Engineers

Engineering Technologist

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## CAREERS IN ENGINEERING

### ENGINEERING TECHNICIAN IN SERVICE INDUSTRY


- Engineering technicians (IOW) shall assist engineer in supervision of engineering work that requires application of engineering principles and data, help solve technical problems in many ways.



SET UP EQUIPMENT




CONDUCT EXPERIMENTS (R&D)



QUALITY CONTROL

- Check product
- Do testing
- Collecting data



COLLECT DATA & CALCULATE RESULT

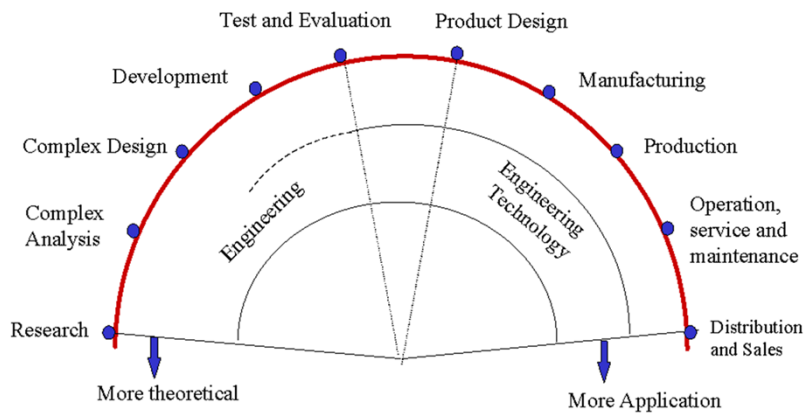
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### ENGINEERING TECHNOLOGY vs ENGINEERING

## Spectrum of Technical Job Functions



Source : Charlie P. Edmonson, "An Approach to Introduce Engineering Technology to High School and Junior High School Students", Department of Engineering Technology, University of Dayton.

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### CAREERS IN ENGINEERING



**TUGASAN KUMPULAN  
KEJURUTERAAN DI KAPAL TLDM**




**VIDEO to be played.**

**Thank you for the video TLDM**


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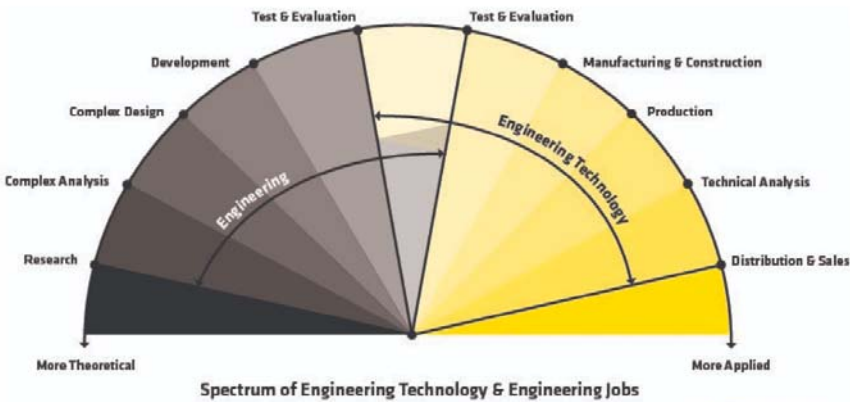


**ENGINEERING AND THE ENGINEERING TEAM**

**Where are the technicians????**




**Almost everywhere.**




**Spectrum of Engineering Technology & Engineering Jobs**

WICHITA STATE UNIVERSITY  
COLLEGE OF ENGINEERING




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**ABET Accredited ETAC**

**ENGINEERING TECHNOLOGY EDUCATION**



**ABET Accredited EAC**


**ENGINEERING EDUCATION**



Distribution and Sales    Operation, Service & Maintenance    Production Engineering    Manufacturing    Component Design    Company Management    Test & Evaluation    Development & Design    Systems Integration    Analysis    Complex Design & Research Analysis    Theoretical Analysis

(Chart above from the American Society for Mechanical Engineers.)

Jobs obtained by graduates of both engineering and engineering technology programs are often similar (American Society for Engineering Education).



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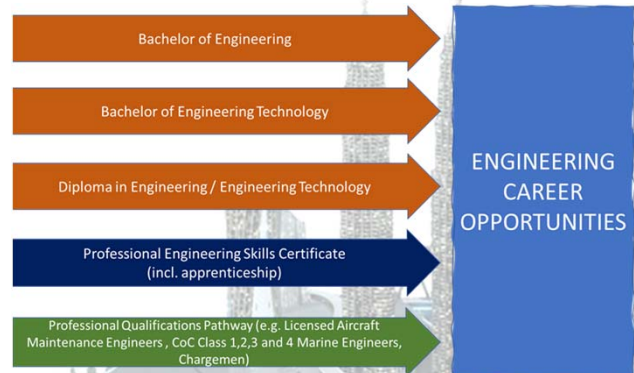
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## CAREERS IN ENGINEERING

### Routes to careers in Engineering

- There are several routes available via an academic programme at Diploma or Degree level in Engineering or Engineering Technology. **These academic programmes are accredited by BEM. For the latest list of accredited programmes visit [www.etac.org.my](http://www.etac.org.my).**
- There are also routes via professional skills qualifications issued by other bodies such as the Energy Commission (eg. Chargeman) and the Construction and Industry Development Board (CIDB).



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## CAREERS IN ENGINEERING

### ENGINEERING TECHNOLOGIST

- Engineering technologist are graduates with a Bachelor's Degree in Engineering Technology (Level 6 MQF)
- **Engineering technologist education and training are application oriented, focusing among others on applied design, product development, manufacturing, product assurance, operation and maintenance based on current engineering practice standards.**
- **Engineering technologists are also known as applied engineers or practical engineers and perform engineering works by applying engineering and scientific knowledge combined with technical skills.**



#### Engineering Technologist

- Implement **engineering works** by applying engineering & scientific knowledge combined with technical skills **to support engineering activities.**

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**CAREERS IN ENGINEERING**

**ENGINEERING TECHNICIAN**

- Engineering technicians are graduates that have acquired an Engineering or Engineering Technology Diploma qualification. Engineering technician education and training are highly application oriented and focusing on practical skills.
- **Engineering technicians are employed to work as part of the engineering team together with engineering technologist and engineers.** Engineering technicians assist engineers and engineering technologist to implement engineering works by applying engineering knowledge combined with practical skills. Engineering technicians support the whole spectrum of engineering activities such as design, development, testing, manufacturing, operation service and maintenance.



**Engineering Technician**

- Implement **engineering technology works** by applying engineering knowledge combined with technical skills to support engineering technology activities.



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**ENGINEERING TECHNICIAN**

- In the job scope of testing for example, engineering technicians assist the engineers and engineering technologist in collecting data, designing and performing tests, assembling equipment and recording test data.

**Engineering Technician**

- Implement **engineering technology works** by applying engineering knowledge combined with technical skills to support engineering technology activities.

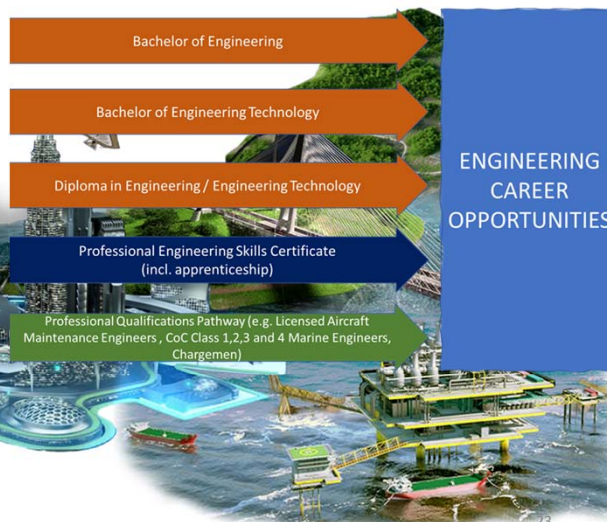


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## Academic and Professional Pathways

- The Board of Engineers Malaysia has recently recognized several Professional Qualifications issued by other authoritative industry bodies such as the Department of Civil Aviation (DCA) and the Marine Department Malaysia (MDM) as equivalent qualifications enabling registration with the BEM.
- Aircraft Maintenance License (AML) holders (Cat B and Cat C) issued by DCA and Marine Engineers with Certificate of Competency Class 1, 2 and 4 issued by MDM may apply to be registered with BEM as Graduate Engineer, Engineering Technologist or Inspector of Works (Engineering Technician) depending on the type of license issued.

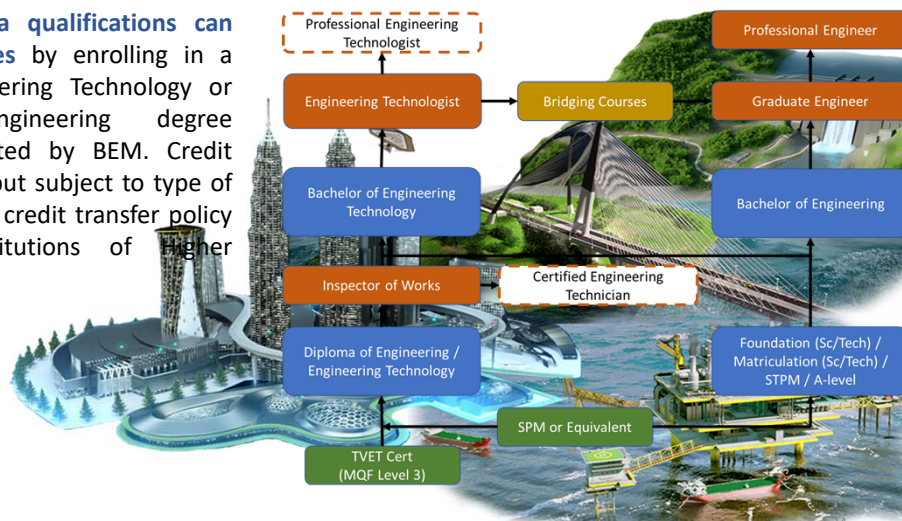


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## Academic and Professional Pathways

- Holders of Diploma qualifications can further their studies by enrolling in a Bachelor of Engineering Technology or Bachelor of Engineering degree programme accredited by BEM. Credit transfer is possible but subject to type of programme and the credit transfer policy of individual Institutions of Higher Learning.



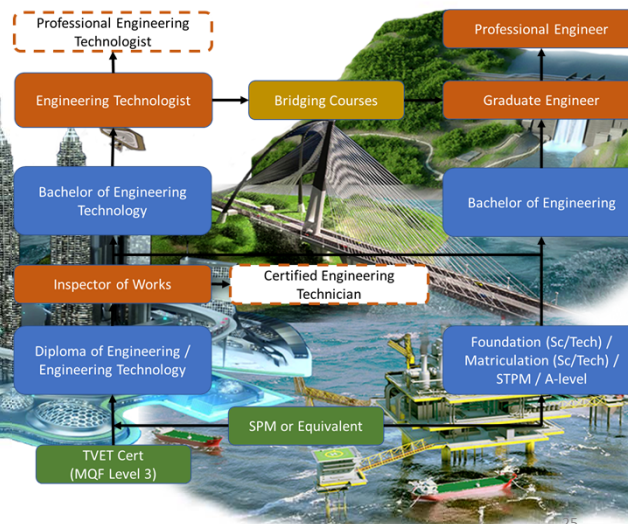
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## Academic and Professional Pathways

### PROFESSIONAL PATHWAY

- Graduates from an accredited Bachelor of Engineering Technology programmes are eligible to register with BEM as an **Engineering Technologist** allowing them to take up employment in providing engineering services.
- Those who wish to further their professional development towards becoming a Professional Engineer may do so by taking up recognized bridging courses (approved top-up courses or a Master of Engineering by coursework) to qualify for registration as a Graduate Engineer. After three (3) years of work experience, a Graduate Engineer may apply to become a Professional Engineer.

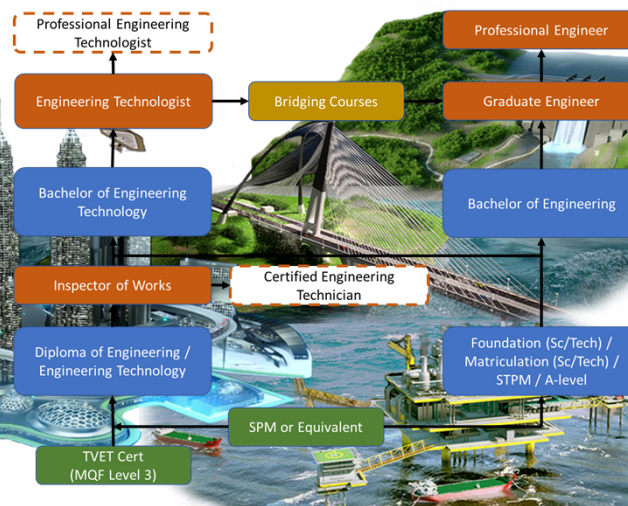


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## Academic and Professional Pathways

- BEM's accredited engineering technology programs provide opportunity for continuous life-long learning and professional upgrading opportunities for various members of the engineering fraternity.
- The BEM is currently in the process of establishing the **Professional Engineering Technologist** and **Certified Engineering Technician** status. Once the PET is established, there may not be necessary for ET graduates to go for PE status.




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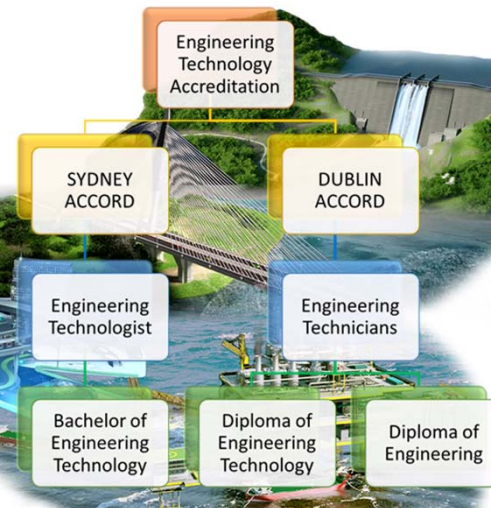


## Accreditation and Recognition


### ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL (ETAC)



- BEM established ETAC in 2015 as the only recognized accrediting body for engineering technology bachelor degree, engineering diploma and engineering technology diploma programmes offered in Malaysia.
- The accreditation by BEM's ETAC also ensures the high quality and competency of graduates from engineering technology programmes at Bachelor and Diploma level.
- As a full signatory to the international Sydney Accord for engineering technologist and Dublin Accord for engineering technician education, BEM's accredited engineering technology programs are internationally benchmarked continuously to meet the high demands and expectations of the public from the engineering fraternity.




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## Accreditation and Recognition

### ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL (ETAC)



- Two programme accreditation standards for use by Institutions of Higher Learning (IHLs) to meet the accreditation requirements namely:
  - Engineering Technology Programme Accreditation Standard 2020.** This standard is applicable for Bachelor of Engineering Technology programmes.
  - Engineering Technician Education Programme Accreditation Standard 2020.** This standard is applicable for both Diploma of Engineering or Diploma of Engineering Technology programmes.



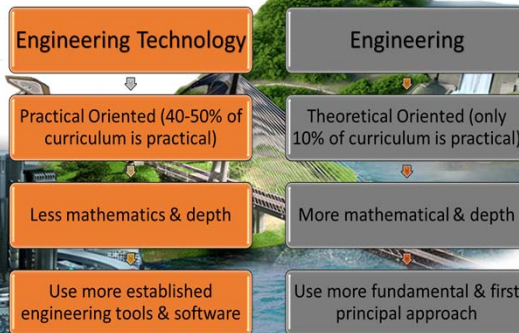
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## Accreditation and Recognition

### ENGINEERING TECHNOLOGY vs ENGINEERING

- An Engineering Technology (ET) programme of study has several differences from an Engineering programme. An ET programme uses a more practical (or applied) oriented approach for students to learn engineering subjects whilst a pure engineering programme will use a more theoretical approach. **ET students will do and perform more laboratory exercises and practical work to support the understanding of engineering subjects.**
- A Bachelor of Engineering Technology program will have between 40-50% practical components in the curriculum. An engineering programme will have not more than 10% practical in its curriculum.



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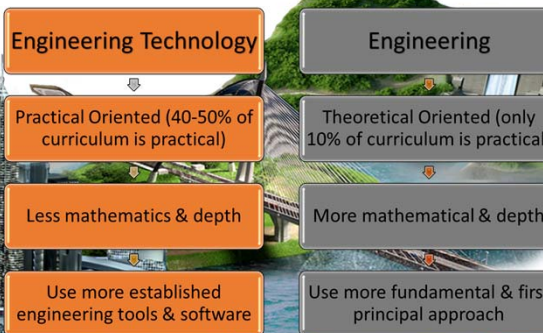


## Accreditation and Recognition





### ENGINEERING TECHNOLOGY vs ENGINEERING

- The focus of an **Engineering Technology programme is on the application of technology and subjects studied will have less depth when compared to an engineering subject.**
- Because of this, an Engineering Technology programme covers less mathematics when compared an engineering programme. Engineering technology students will be trained to use more engineering tools and software when designing and solving engineering problems.



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## Accreditation and Recognition

### ENGINEERING TECHNOLOGY vs ENGINEERING

**DEPTH OF KNOWLEDGE REQUIRED**

ENGINEERING	ENGINEERING TECHNOLOGY	
<p>Washington Accord Complex Problems</p> <div style="background-color: #333; color: white; padding: 10px; margin-top: 10px;">                     In-depth knowledge that allows a fundamental-based first principles analytical approach                 </div>	<p>Sydney Accord Broadly Defined Problems</p> <div style="background-color: #e67e22; color: white; padding: 10px; margin-top: 10px;">                     Knowledge of principles and applied procedures or methodologies                 </div>	<p>Dublin Accord Well defined Problems</p> <div style="background-color: #27ae60; color: white; padding: 10px; margin-top: 10px;">                     Solved using limited theoretical knowledge, but requires extensive practical knowledge                 </div>

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## ACADEMIC PROGRAMME ENTRY QUALIFICATIONS

- Students from a diverse academic background are eligible for entry into ETAC Diploma Level programme ranging from SPM, TVET Certifications (Level 3), Matriculation /Foundation and also MQA Accreditation of Prior Learning (APEL)

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## ACADEMIC PROGRAMME ENTRY QUALIFICATIONS

- For the Bachelor of Engineering Technology programme, the minimum allowable entry qualification ranges from a recognized Diploma (MQA Level 4), STPM, Matriculation / Foundation and also MQA APEL A.



- Detailed and other additional entry requirements are however subject to intake policy of individual Institutions of Higher Learning (IHLs) offering the programme.

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## Recognition and Mobility



### INTERNATIONAL ENGINEERING ALLIANCE

- Malaysia are signatories to the **Sydney and Dublin Accords** which falls under the umbrella of the International Engineering Alliance.
- The Sydney and Dublin Accords were initiated to establish an international benchmarking for engineering technology qualifications at Bachelor and Diploma levels respectively and has developed statements of graduate attributes and professional competency profiles.**
- As of 2021, the Sydney Accord has eleven (11) full signatories namely Australia, Canada, Chinese Taipei, Hong Kong China, Ireland, Korea, South Africa, United Kingdom, United States, Malaysia and New Zealand. Another two (2) countries are provisional signatories namely Peru and Sri Lanka.



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## Recognition and Mobility

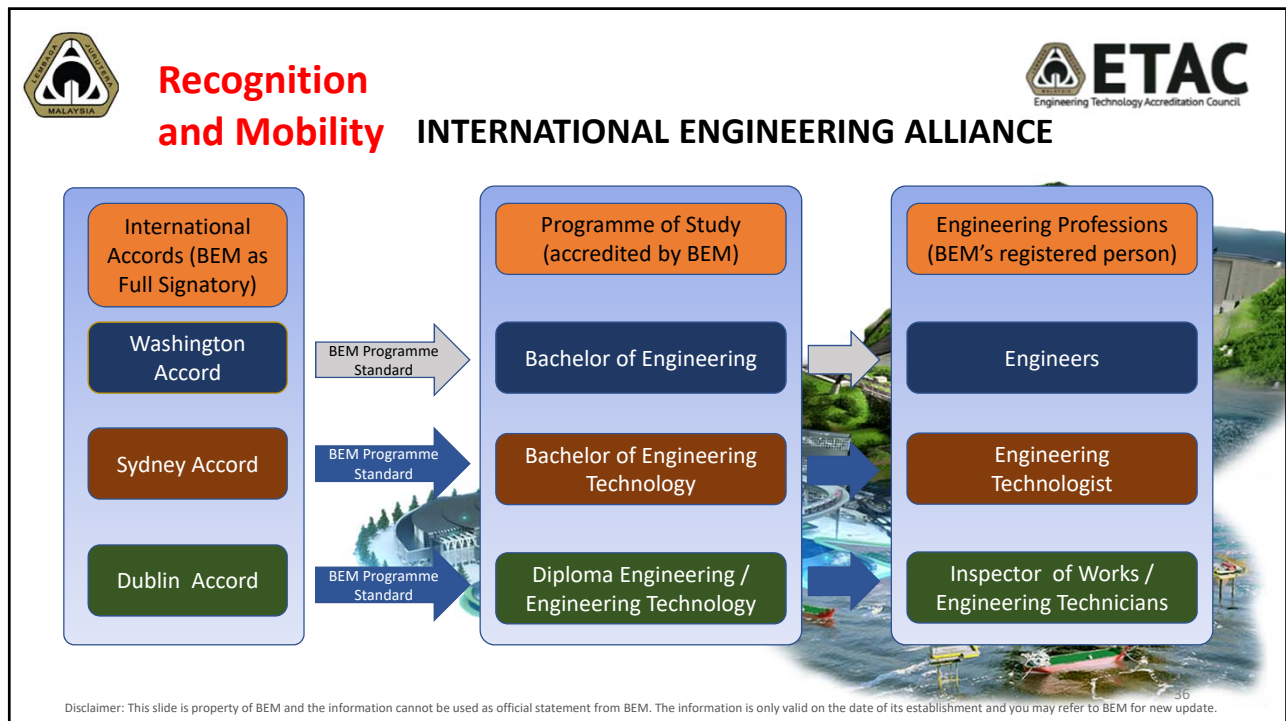



- Meanwhile, the Dublin Accord has nine (9) full signatories namely Australia, Canada, Ireland, New Zealand, Korea, South Africa, United Kingdom, United States and Malaysia.
- A key benefit for holders of **BEM accredited qualifications** is that the programmes are recognized by other members of the international accords as 'substantially equivalent'. This makes it easier for qualification holders to gain professional registration in other countries, enhancing **internationally mobility and employment opportunities**.






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## Recognition and Mobility

### INTERNATIONAL ENGINEERING ALLIANCE (IEA)



**Educational Accords**

- Washington Accord
- Sydney Accord
- Dublin Accord



**Competence Agreements**

- APEC Engineer
- International Professional Engineer
- **International Engineering Technologist**
- **International Engineering Technician**

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## Recognition and Mobility



### What is AFEO?

**The ASEAN Federation of Engineering Organisations (AFEO) is a non-governmental body.**

**Its members are the engineering institutions and organisations of ASEAN countries with the following main objectives:**

- **To promote goodwill and mutual understanding**
- **To establish and develop a ASEAN baseline standard for the engineering profession with the objective of facilitating the mobility of the engineers within the ASEAN countries.**



**ASEAN Federation of Engineering organisation**





## Recognition and Mobility

# The Role of AFEO & AER




- ✓ FACILITATE THE **MOBILITY OF Engineers, Engineering Technologists and Engineering Technicians** within the ASEAN Countries
- ✓ Similar to the **EUROPEAN ENGINEER REGISTER (EURO Eng)**

Both are **STAKEHOLDERS' INITIATIVES** to recognise **"COMPETENCY"** and **"BRANDING"** of the engineering personnel

ASEAN  
ENGINEERING  
TECHNOLOGIST

ASEAN  
ENGINEERING  
TECHNICIAN





**ASEAN ENGINEERING REGISTER**

THE ASEAN FEDERATION OF ENGINEERS AND ENGINEERING TECHNICIANS



## Opportunities

A registered technologist with AER is entitled to use the post nominal title **ASEAN ENGINEERING TECHNOLOGIST** behind his name

A registered technician with AER is entitled to use the post nominal title **ASEAN ENGINEERING TECHNICIAN** behind his name








- 1**  
 Bigger market for expertise
- 2**  
 Better employment prospects
- 3**  
 Greater avenue for sharing of knowledge, expertise and technology
- 4**  
 Increased related business potential
- 5**  
 Wider networking and strategic alliances





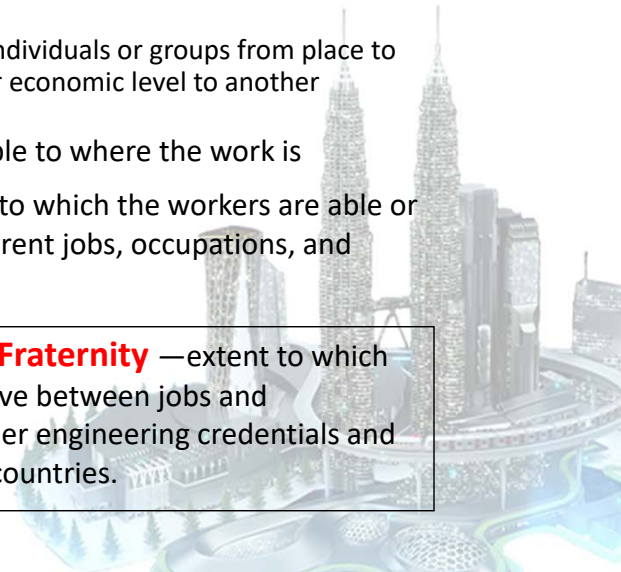
## Recognition and Mobility

### What does Mobility mean?

# AFEO

- ✓ Mobility – n. the movement of individuals or groups from place to place, job to job, or one social or economic level to another
- ✓ Talent mobility—moving people to where the work is
- ✓ Manpower mobility —extent to which the workers are able or willing to move between different jobs, occupations, and geographical areas

✓ **Mobility of Engineering Fraternity** —extent to which the Engineers are able to move between jobs and geographical areas with proper engineering credentials and mutual recognitions among countries.





## Recognition and Mobility

### REGISTRATION WITH PROFESSIONAL INSTITUTION / SOCIETIES (AFEO'S AER) In Malaysia- The Institution of Engineers Malaysia (IEM)



AFEO

AER

ASEAN Engineer (ASEAN Eng.)

ASEAN Engineering Technologist (ASEAN Eng. Tech.)

ASEAN Technician (ASEAN Tech.)

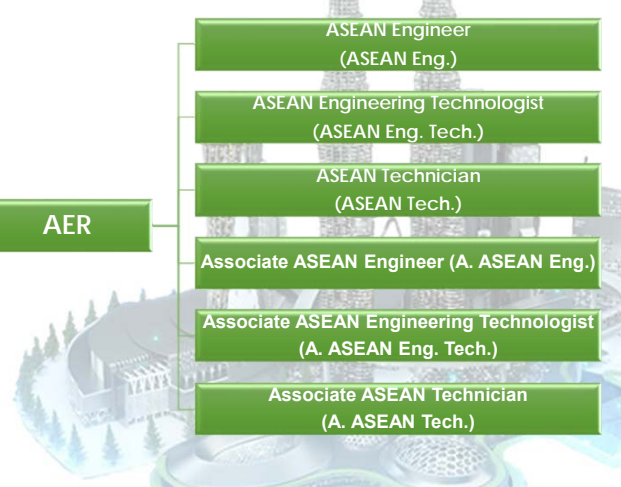
Associate ASEAN Engineer (A. ASEAN Eng.)



Associate ASEAN Engineering Technologist (A. ASEAN Eng. Tech.)

Associate ASEAN Technician (A. ASEAN Tech.)

The ASEAN Federation of Engineering Organisations (AFEO) is formed by 10 ASEAN member organisations:

Persatuan Ukur Jurutera & Arkitek (PUJARA)	Board of Engineers Cambodia (BEC)
Persatuan Insinyur Indonesia (PII)	Lao Union of Science and Engineering Associations (LUSSEA)
The Institution of Engineers, Malaysia (IEM)	Myanmar Engineering Society (MES)
The Philippine Technological Council (PTC)	The Institution of Engineers Singapore (IES)
The Engineering Institute of Thailand (EIT)	Vietnam Union of Science and Technology Associations (VUSTA)







## INSTITUTION OF ENGINEERS MALAYSIA (IEM)



- ❑ A learned society where engineers, engineering technologist and technicians of various disciplines in every sector of economic activities come together for mutual helpfulness and sharing of experiences and technologies;
- ❑ IEM works closely with BEM to enhance the status of engineers in the society;
- ❑ Establish social linkage between engineers and help young engineers to establish themselves in their career;
- ❑ In general, a learned institution for practicing engineers in Malaysia for networking, technical learning and socializing.

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### AFEO And ASEAN Engineering Register

## Samples of Medallions and Certificates


**ASEAN ENGINEERING TECHNOLOGIST**  
Etching Medal (Chrome silver)  
Size: 2" Dia x 1mm Thick  
RM 12.00/pc (based on order quantity of 100pcs)





**ASEAN  
Engineering Technologist  
(AET)**

**ASSOCIATE ASEAN ENGINEERING TECHNOLOGIST**  
Etching Medal (Chrome silver)  
Size: 1.5" Dia x 1.5mm Thick  
RM 10.00/pc (based on order quantity of 100pcs)





**Associate ASEAN  
Engineering Technologist  
(AAET)**



**AFEO**  
And ASEAN Engineering Register





## Samples of Medallions and Certificates

**ASEAN TECHNICIAN**  
Etching Medal (Chrome silver)  
Size: 2" Dia x 2mm(Thk)  
RM 12.00/pc (based on order quantity of 100pcs)





**ASEAN Technician (AT)**

**ASSOCIATE ASEAN TECHNICIAN**  
Etching Medal (Chrome silver)  
Size: 1.5" Dia x 1.5mm(Thk)  
RM 10.00/pc (based on order quantity of 100pcs)





**Associate ASEAN Technician (AAT)**



## Recognition and Mobility

Engineering Technologist and Engineering Technicians must increase competency and competitiveness to gear toward Mobility and Engineering Services in a Liberalised and Globalised ASEAN market

### LOOKING FORWARD



ASEAN Engineers (AE)



**AEC**  
ASEAN ECONOMIC COMMUNITY



**Blueprint 2016-2025**

- 


A Highly Integrated and Cohesive Economy
- 

A Competitive, Innovative, and Dynamic ASEAN
- 


Enhanced Connectivity and Sectoral Cooperation
- 

A Resilient, Inclusive, People-Oriented, and People-Centred ASEAN
- 

A Global ASEAN



## Recognition and Mobility




## AFCO







### Why Mobility is important?

- ✓ Sharing knowledge and expertise
- ✓ ASEAN people building ASEAN
- ✓ ASEAN Engineers to gain from ASEAN potential market/sectors

2016

USD  
594  
billion



 US\$ <b>228</b> bn Power	 US\$ <b>128</b> bn Roads	 US\$ <b>26</b> bn Water & Sanitation	 US\$ <b>119</b> bn Railways	 US\$ <b>16</b> bn Airports	 US\$ <b>33</b> bn Ports
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## Recognition and Mobility

### Looking Forward



**Eng. Technologist & Eng. Technicians to achieve Mobility effectively and efficiently**

Work with Partners in the Region and Beyond

Addressing the challenges

Work Together as a Team





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