



Engineering TVET in Malaysia: Introduction to Engineering Technologist and Engineering Technicians

Speaker

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Outline of Presentation

What is an Engineering Technologist (ET) and Engineering Technicians

How to become and Engineering Technologist or Technicians

Mobility of Engineering Technologist and Engineering Technicians

Introduction



What is Engineering

Engineering is the field or discipline, practice, profession and art that relates to the development, acquisition and application of technical, scientific and mathematical knowledge about the understanding, design, development, invention, innovation and use of materials, machines, structures, systems and processes for specific purposes.

(UNESCO 2010)

“Ingenium”

“technikos”





Definition : **TVET** >> Technical and Vocational Education Training

TVET as defined by UNESCO : an education that involves “in addition to general education, the study of technologies and related sciences as well as the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economics and social life”.

Engineering Technologist and Engineering Technician are graduates from Engineering Technologist & Engineering Technician Education programmes.

Examples of other Technologist occupation:



Food Technologists



Medical Laboratory Technologist



Agricultural Technologist Near Branches ...



Agricultural Technologists ...

Agricultural Technologists



Radiologic Technologists



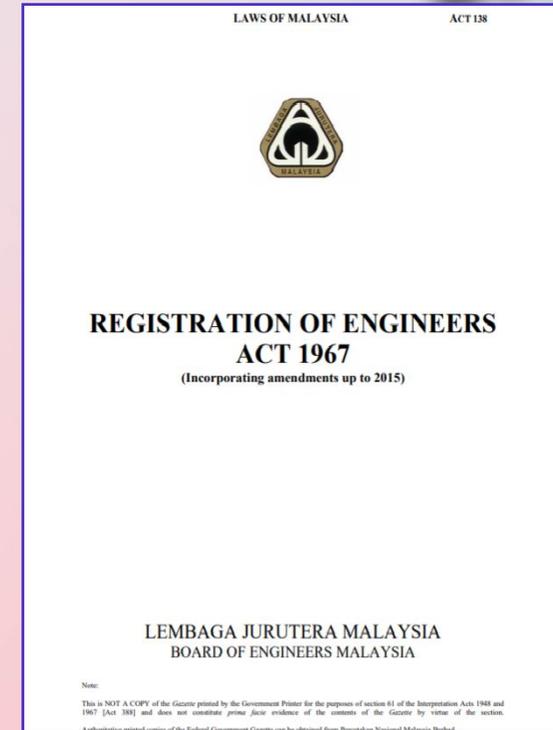


Introduction

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 Practicing 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.



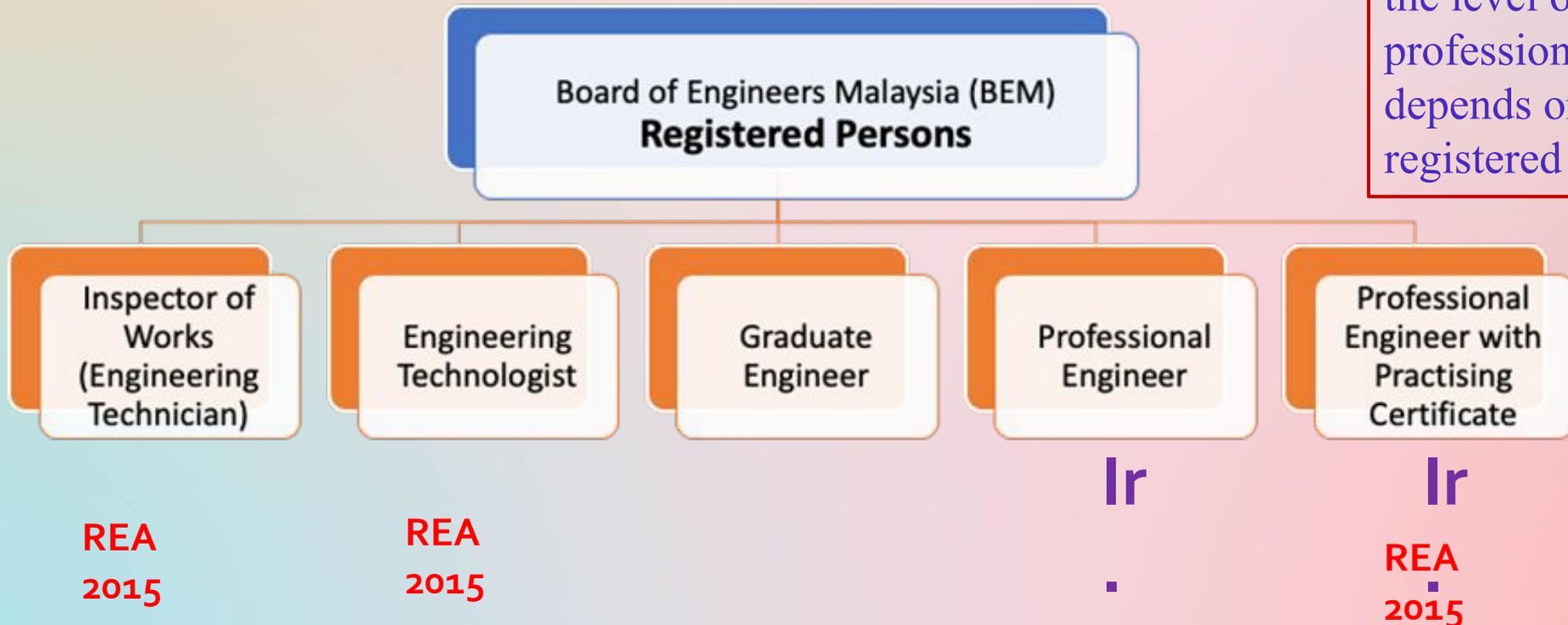
Registration of Engineers Act (REA) (1967)

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



Board of Engineers Malaysia (BEM) the regulatory body for Engineering practices in Malaysia. It was 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.

BEM Registered person is thus recognized in Malaysia and the level of competency and professional recognition depends on the individuals registered categories.



Introduction



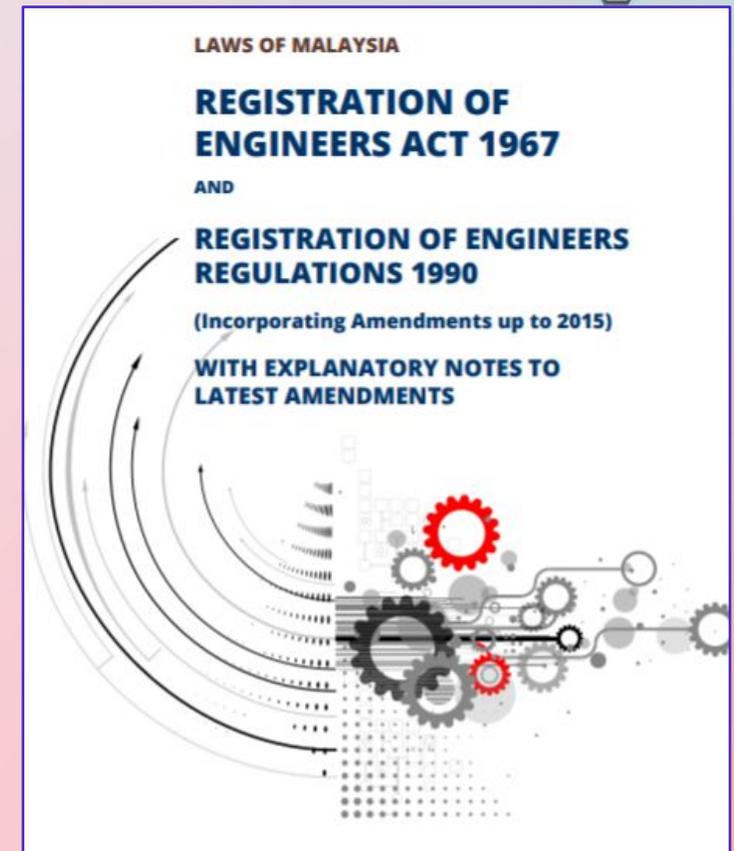
Why do we need the Registration of Engineers Act ?

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.

Regulato
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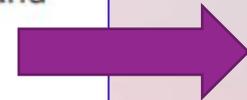
Introduction



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.



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

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.





PART III – REGISTRATION OF ENGINEERS Inspector of Works, Engineering Technologist & Graduate Engineers

Section 7(2). - New Section

Notwithstanding 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;**

Introduction



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**.”



New types of engineers and technologist in Malaysia continue its role as the nation builders not only physically but also as knowledge base engineers.



Mechatronics Engineering.

Engineering education became more essential and the need to produce quality engineers/Technologist/Technicians requires



Accreditation of engineering programmes



Biomedical engineers



The **start of accreditation in Malaysia was in 1957**. It was conducted by the Public Services Department (PSD) with the purpose of employment in the public service.

When IEM was created in 1959, one of its purposes was to ensure that the quality of engineers in Malaysia were of a certain standard and it started **accreditation of engineering programmes at the Bachelor level in 1959**.

Objective of accreditation.



ACCREDITATION OBJECTIVE	IMPORTANCE OF ACCREDITATION TO IHLS	IMPORTANCE TO THE PROFESSION
<ul style="list-style-type: none"> To ensure that graduates of the accredited engineering programmes satisfy the minimum academic and practical requirements for registration with BEM. To satisfy MQA's requirements under the Malaysian Qualification Framework To ensure that Continual Quality Improvement (CQI) is being practiced by IHLs, and may also serve as a tool for benchmarking. Allow international mobility of graduates. 	<ul style="list-style-type: none"> Recognises institutional missions and goals Involves faculty/staff in evaluation and planning Assists institutions in determining the acceptability of transfer credits Promotes "best practices" in education Increases visibility and reputation of the institution Aids engineering schools to identify required operational resources to institution management 	<ul style="list-style-type: none"> Ensures that graduates have met the educational requirements to enter the profession Enhances the mobility of graduate professionals Provides professional development for faculty and industry practitioners Provides opportunity for the profession to guide the educational process to reflect current and future needs

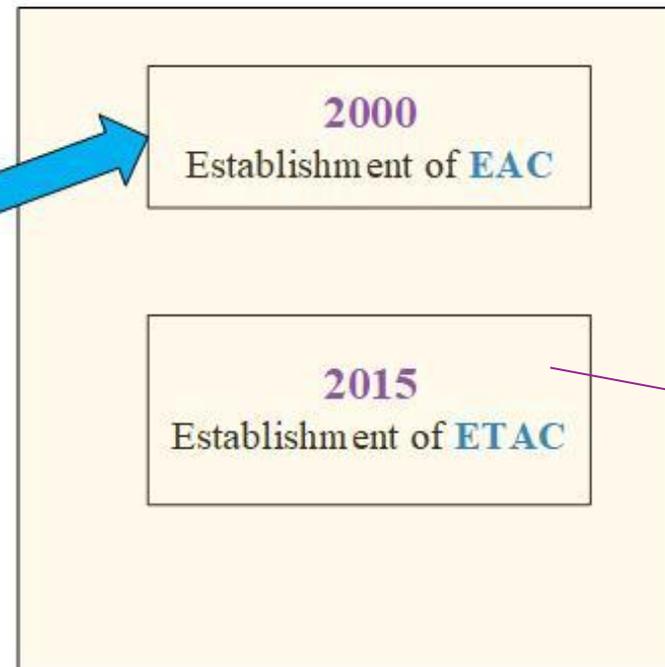


1957
Accreditation by the **PSD** for admission to Public service.

1959
Accreditation by **IEM**

1967
Joint Accreditation by **IEM and BEM**

1996
Establishment **LAN** (National Accreditation Board). Lan is later renamed to **MQA** (2007)

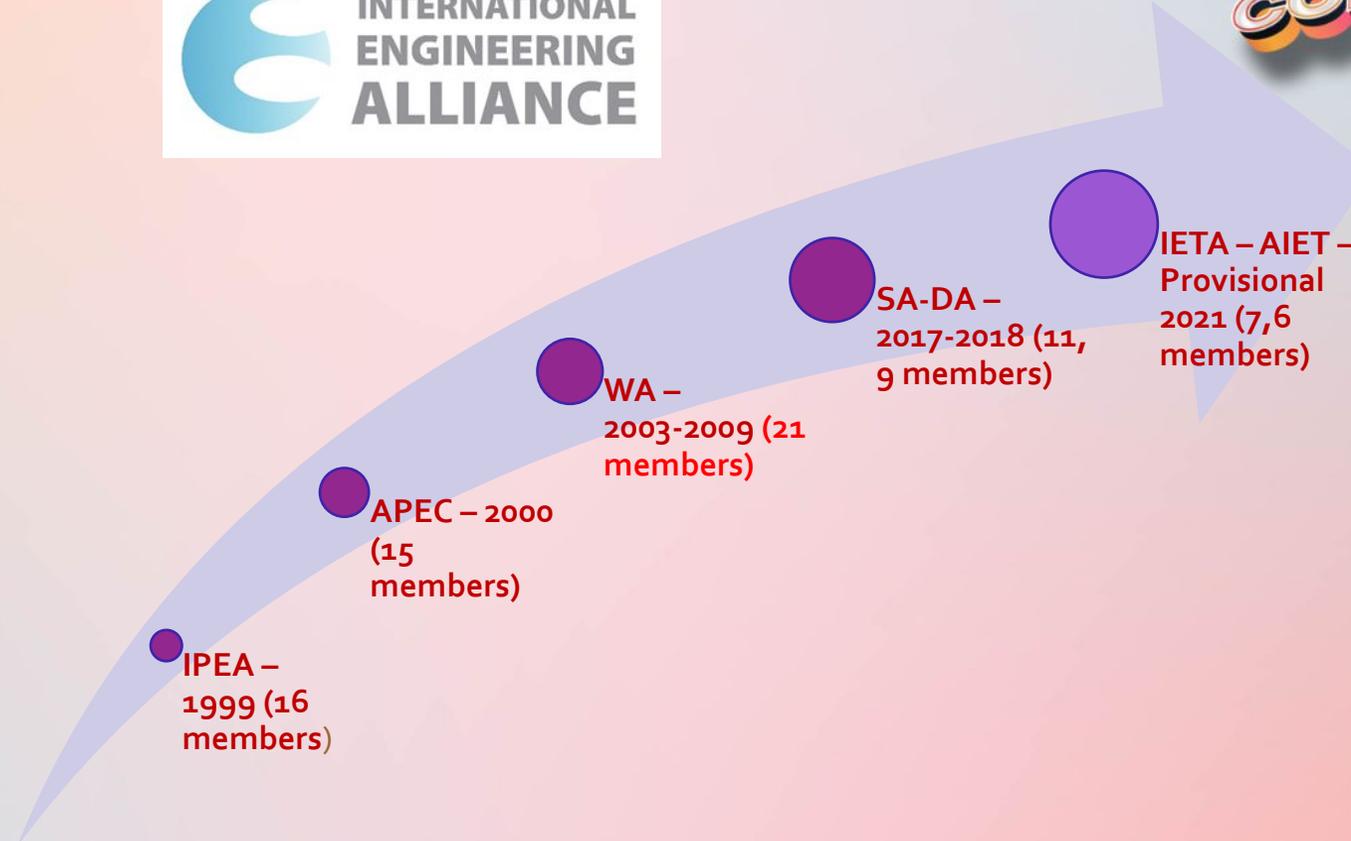


Technologist and Technicians

Malaysia's accreditation journey of engineering programs



International agreements **GOVERN** the recognition of engineering educational qualifications and professional competence, thus establishing and enforcing **internationally bench-marked standards.**



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.

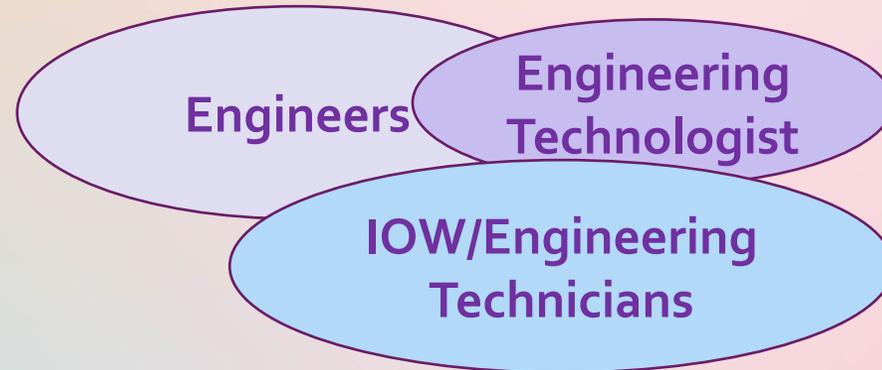
The scope of engineering services or engineering works encompass the entire product life cycle that includes research, complex analysis, complex design, development, product design, testing & evaluation, manufacturing, operations, service & maintenance and distribution & sales



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.

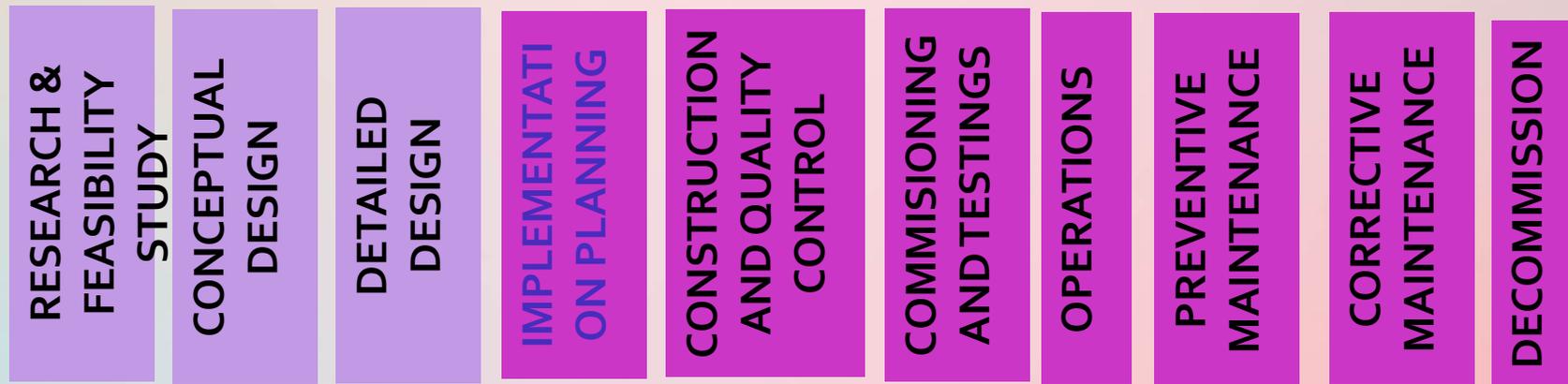


Engineering team performs engineering services or works and in many cases there are overlapping of functions.



CAREERS IN ENGINEERING

CASE STUDY: CONSTRUCTION INDUSTRY

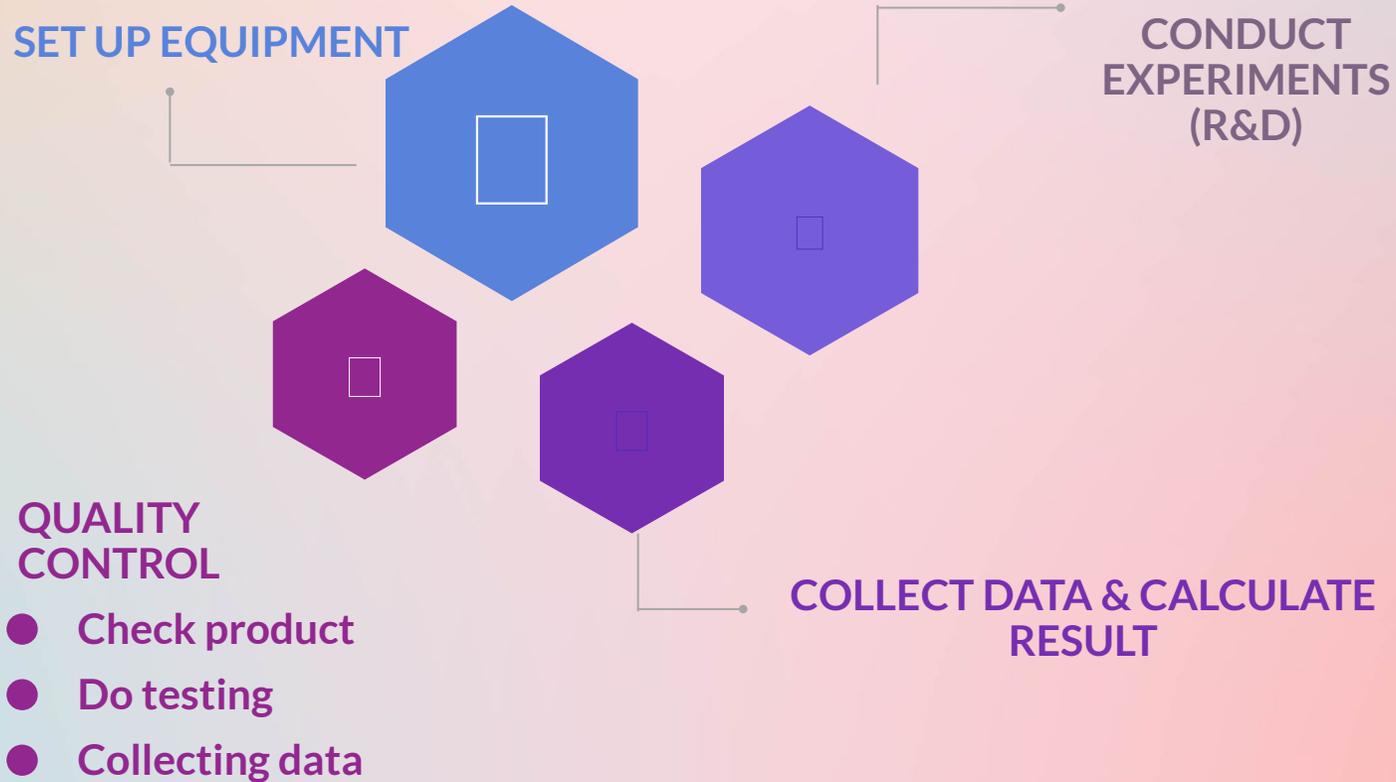


CAREERS IN ENGINEERING



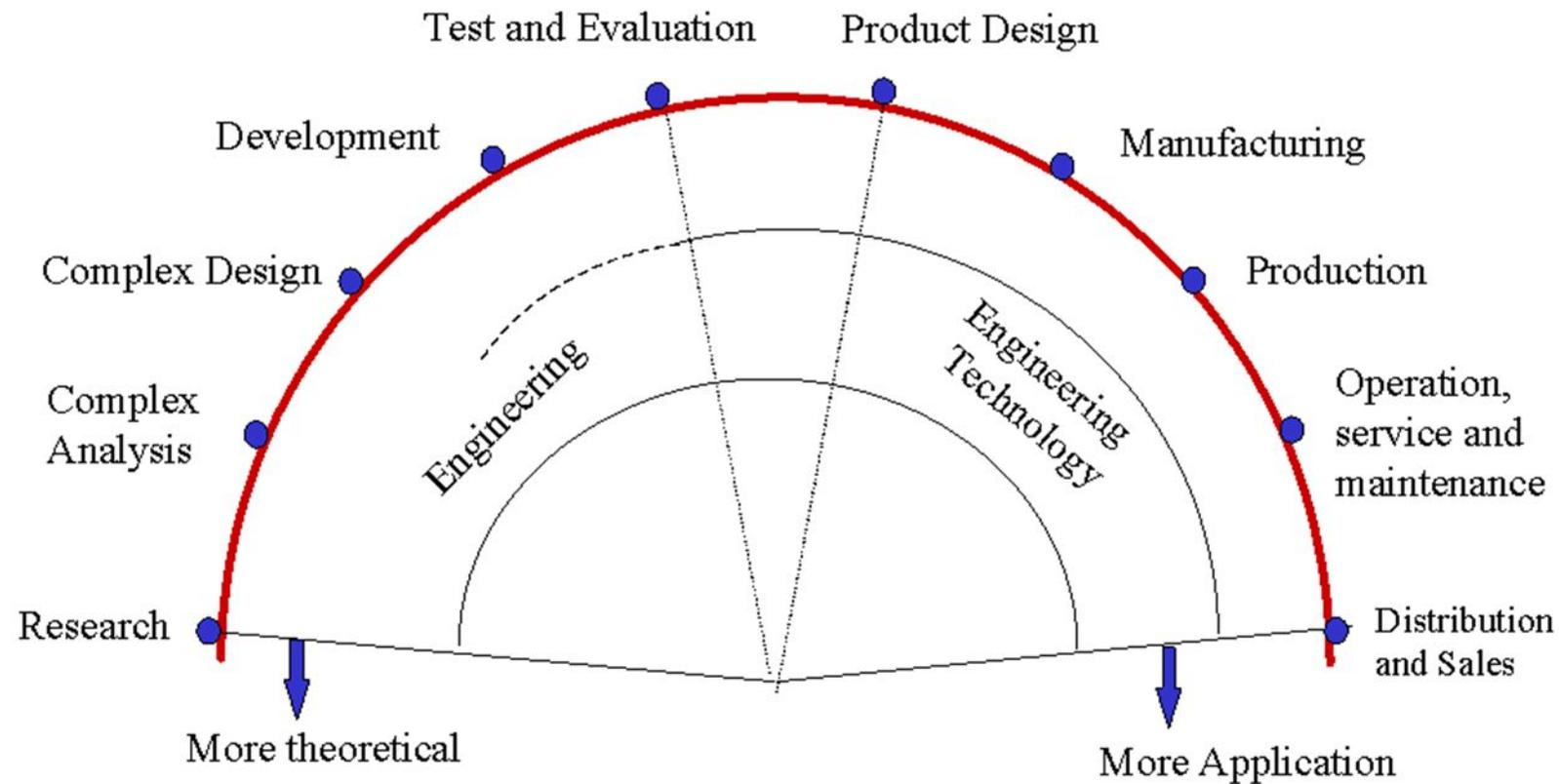
ENGINEERING TECHNICIAN IN SERVICE INDUSTRY

- 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.



ENGINEERING TECHNOLOGY vs ENGINEERING

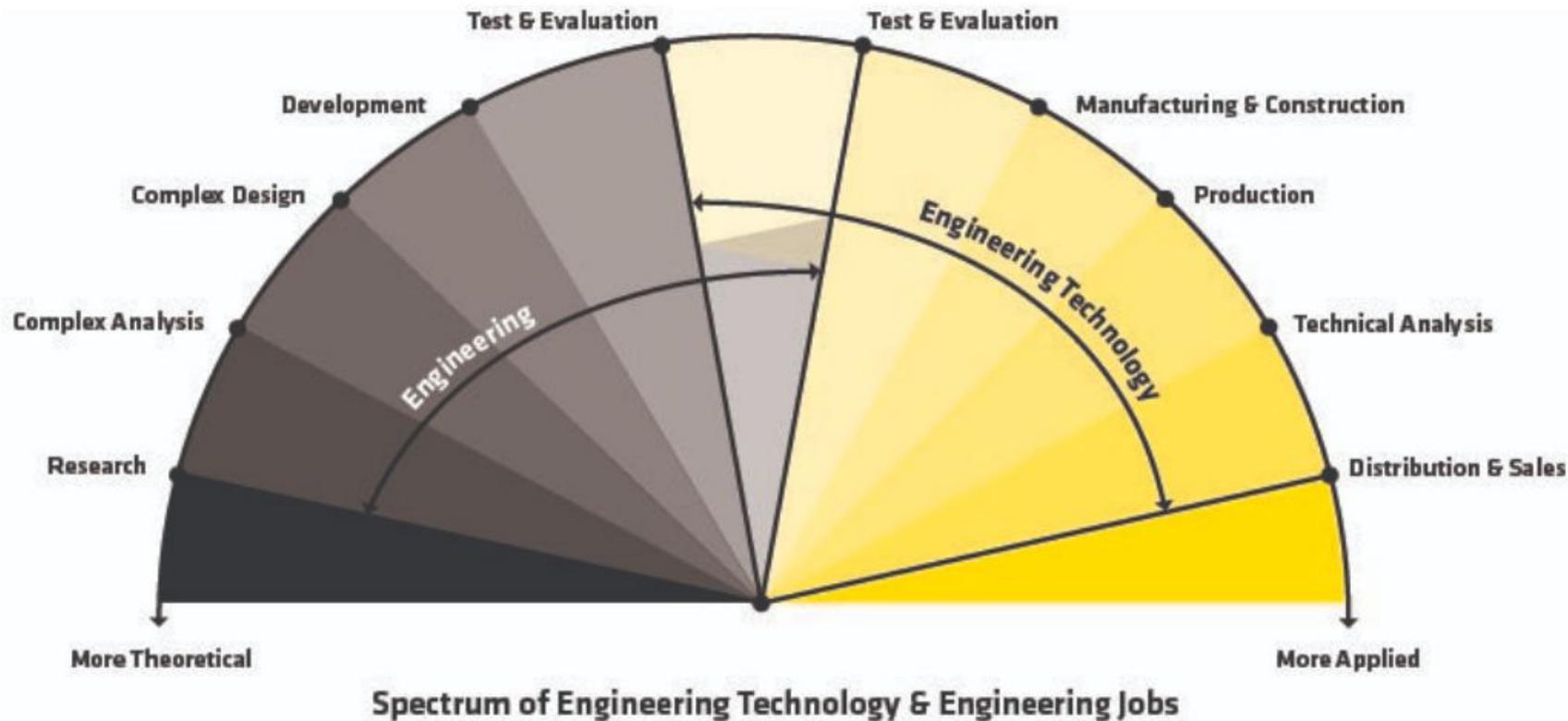
Spectrum of Technical Job Functions



ENGINEERING AND THE ENGINEERING TEAM

Where are the technicians????

Almost everywhere.



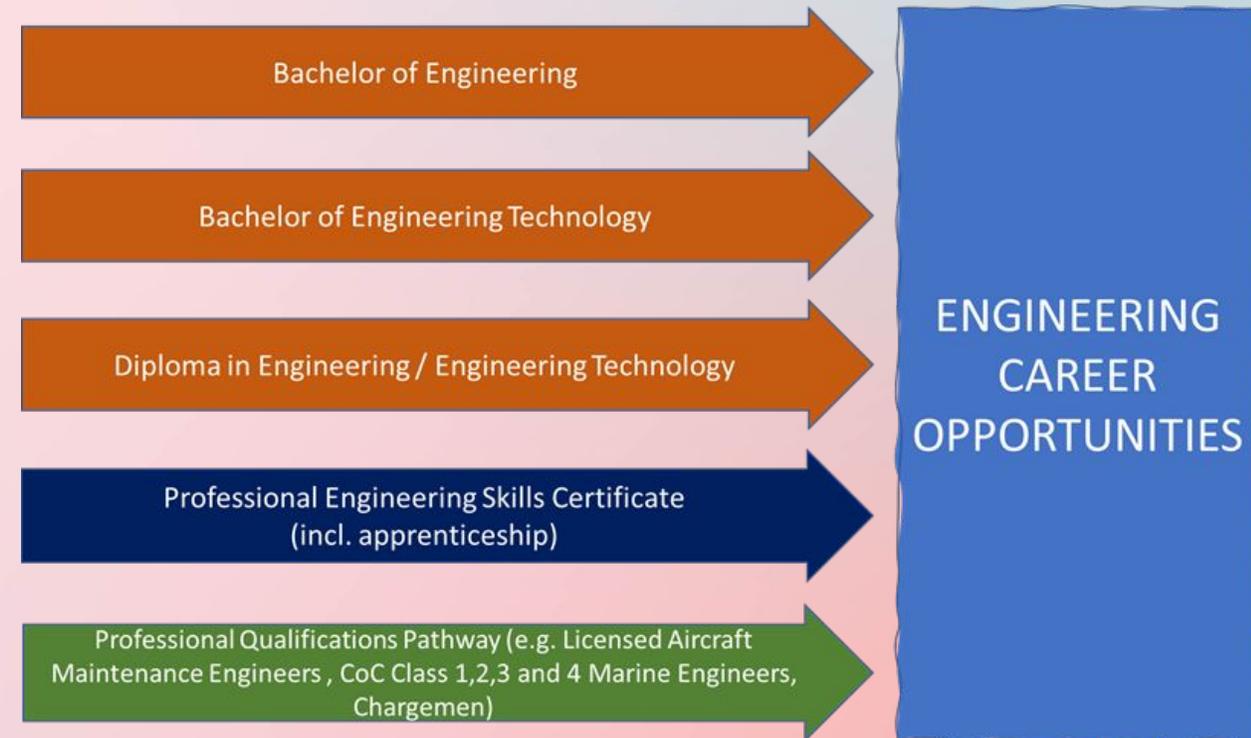
CAREERS IN ENGINEERING



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.**

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).





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.**



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.**



ENGINEERING TECHNICIAN

Example: 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.

CAREERS IN ENGINEERING

Inspector of Works (IOW)

Inspector of Works (IOW) who is registered with the Board usually takes up employment which requires him to assist the Professional Engineer in the supervision of engineering works".

The registration of IOW mainly under the three (3) main engineering disciplines i.e. **Civil, Electrical and Mechanical** or any other disciplines deemed appropriate.

IOWs carry out supervision of engineering works on site assisting the Professional Engineers (PEPC /ECPs)

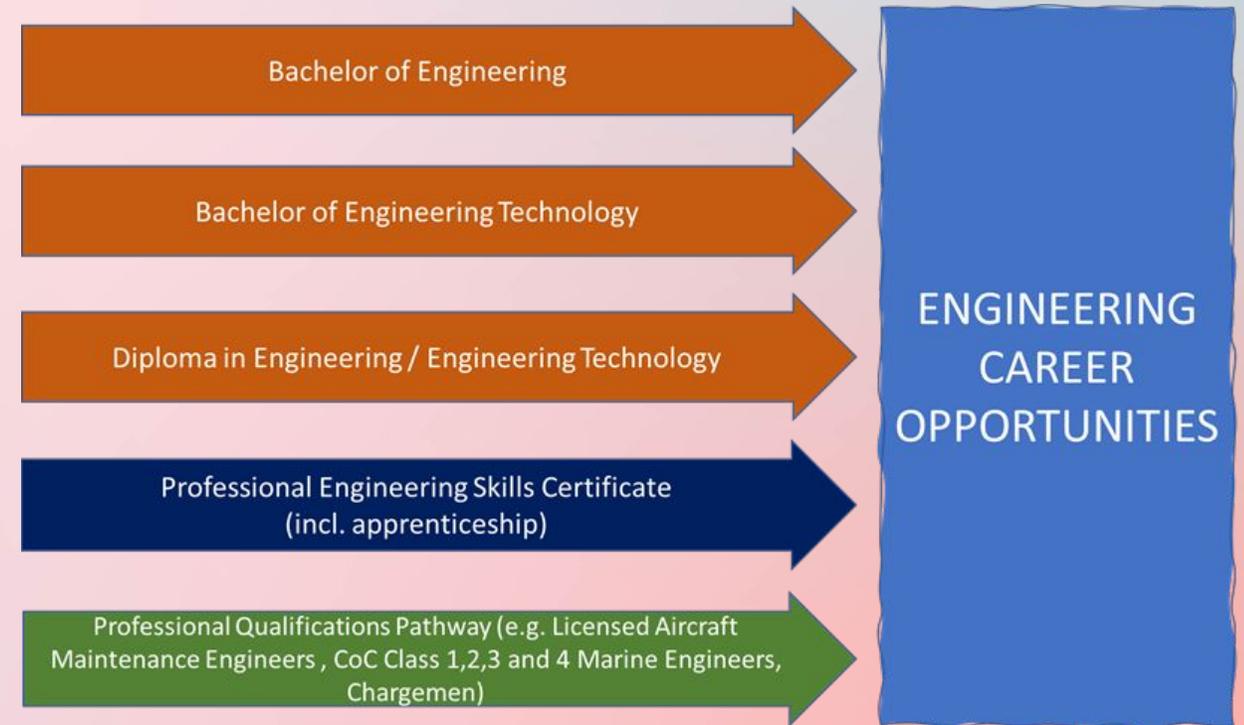




Academic and Professional Pathways

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.

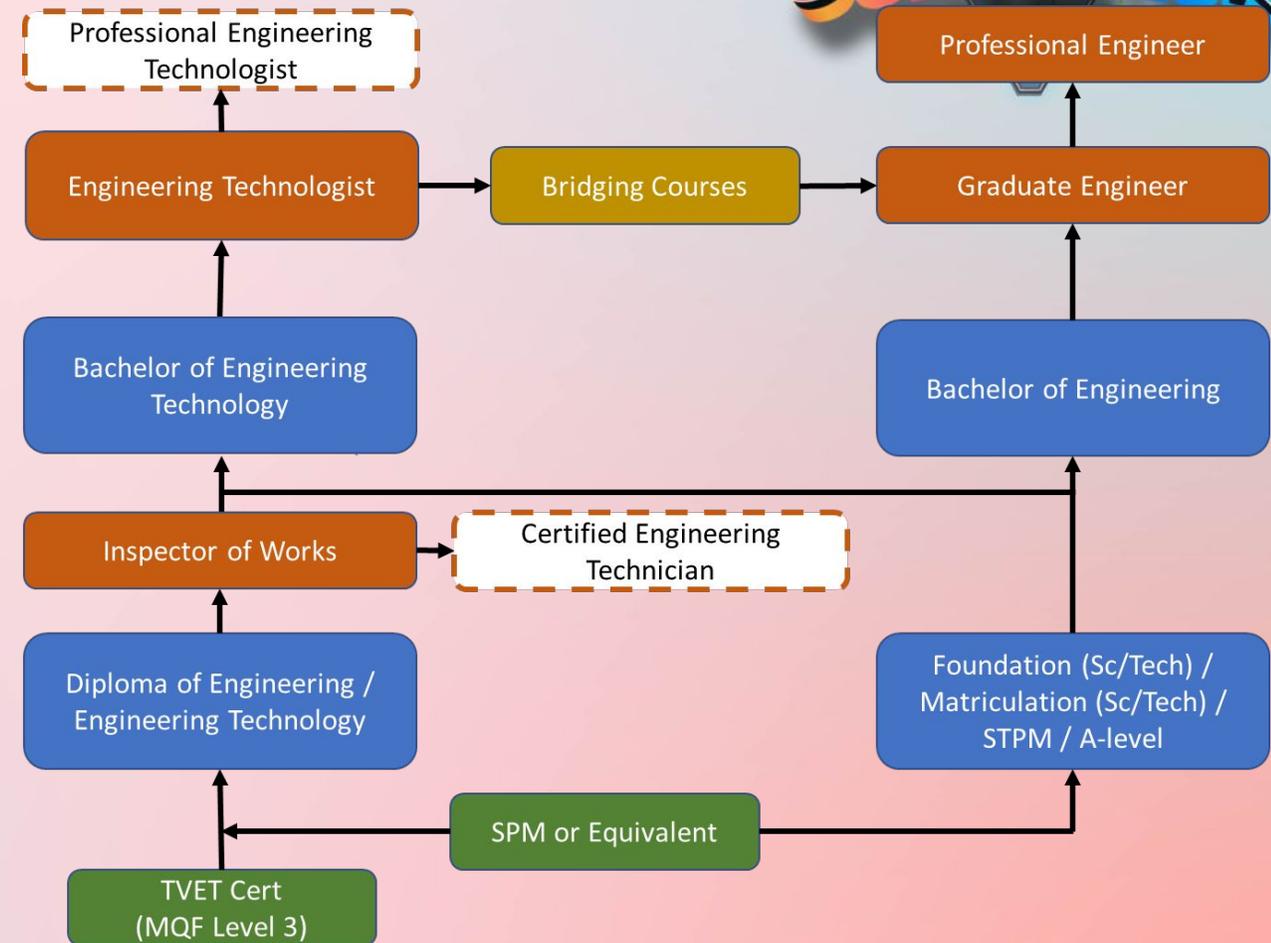


Academic and Professional Pathways



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.



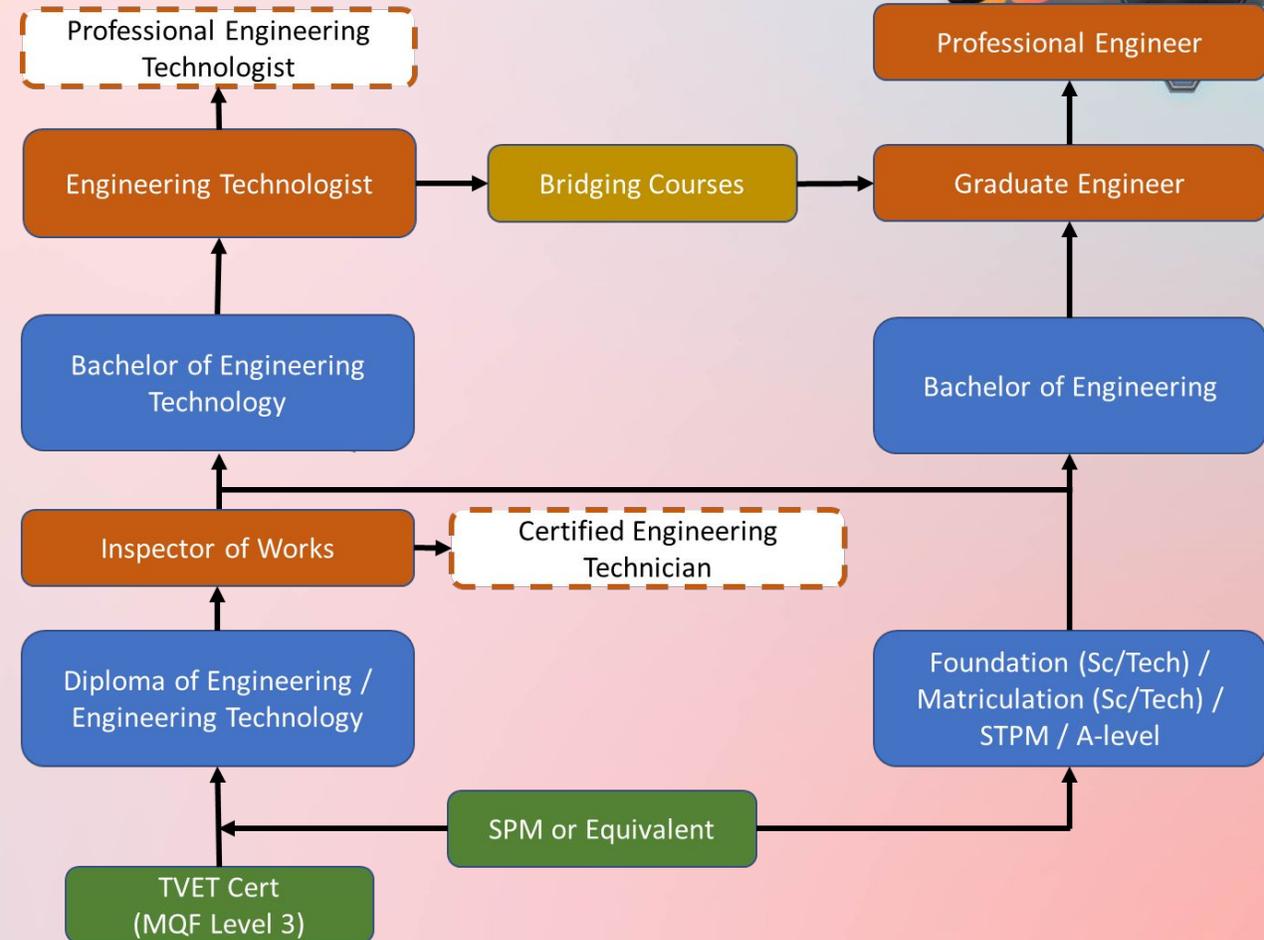


Academic and Professional Pathways



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.





Registration of IOW

The recognized academic qualification for registration as an Inspector of Works with BEM includes the following:

1. Engineering Diploma awarded by Malaysia:

- Minimum Diploma in Engineering accredited by the Board's Engineering Technology Accreditation Council (**ETAC**).
- Minimum **Diploma in Engineering** accredited by Malaysian Qualification Agency (MQA) or equivalent recognised by BEM (**before 31st Dec 2018**)

2. Engineering Diploma awarded by Other Country:

- Diploma in Engineering accredited by professional body who are signatory of **Dublin Accord** is acceptable.

3. CAAM / DCAM Aircraft Maintenance License

- **Type Category B (without type rating)** of Aircraft Maintenance Licence (AML)

4. Certificate of Competency as Marine Engineer

- Third, Fourth (Junior Marine Engineer) or "holder of **Fourth Class Certificate of Competency as Marine Engineer**"

Subsection 10(E)

stipulates the qualification for registration as an Inspector of Works with BEM. A person who holds any qualification which is recognized by the Board shall be entitled on application to be registered as Inspector of Works.

Registration of IOW/Technician

Academic Qualification/ Equivalent



Example :

3. CAAM / DCAM Aircraft Maintenance License

- Type Category B (without type rating) of Aircraft Maintenance Licence (AML)

The graphic is titled "ANNOUNCEMENT" and "Registration of Civil Aviation Authority Malaysia (CAAM) Part 66 Aircraft Maintenance License (AML) Holder". It features a yellow banner stating "Holder of the following licenses are eligible to apply for registration with BEM". Below this, three categories are listed: 1. Graduate Engineer (Valid CAAM / DCAM Part 66 Category C holder including at least one type rating). 2. Engineering Technologist (Valid CAAM / DCAM Part 66 Category B1, B2 holder including at least one type rating). 3. Inspector of Works (Technician) (Valid CAAM / DCAM Part 66 Category B1, B2 holder without any type rating). The graphic also includes the BEM logo, a CAAM logo, and a red "REGISTRATION OPEN" badge.

Equivalent
Qualification

Registration of IOW



IOW in Existing Practice

IOW In Existing Practice Before REA 2015

All **existing IOW** who were under employment of an ECP have the right to be registered with the Board during the transition period which was extended to **31st December 2018**.

After the deadline, existing IOW with the stipulated IOW qualification i.e. Diploma or Degree, with relevant site experience, can register as **IOW**.

Numerous applications for registration of IOW were received after the deadline and rejected due to the qualification criteria set. We were unable to accept non-engineering qualification for consideration after the transition period.



Registration of IOW

New IOW not Existing Practice

New IOW with no supervision experience registered as **Intern IOW** and work under the supervision of a registered IOW or Engineer/Eng. Technologist on site.

To register as IOW, the Intern IOW has to :

- i. Complete **site experience**
 - Diploma holders – min. 2 years site supervision exp.
 - Degree holders – min. 1 year site supervision exp.
- ii. to attend **BEM's approved IOW courses**,
- iii. complete with the registration application at the end of his internship period with **experience and CPD records** verified/endorsed by PEPC.



Accreditation and Recognition

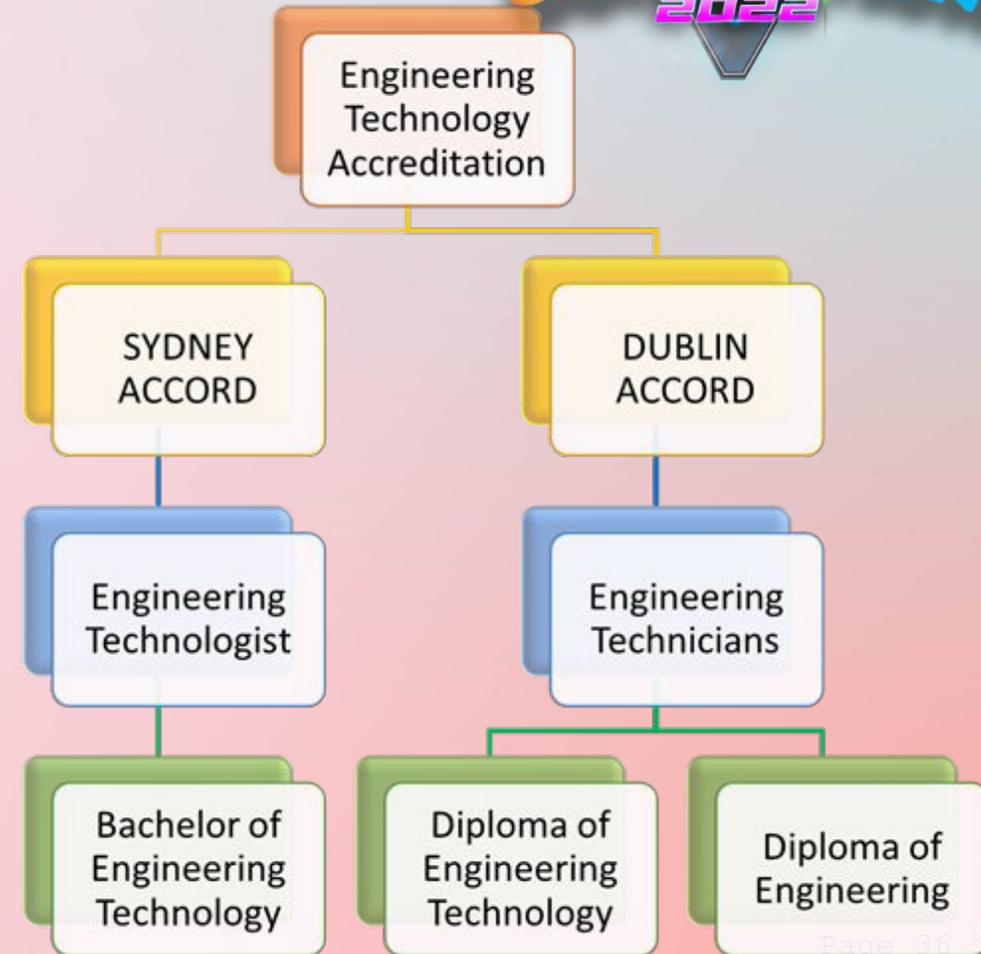


ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL (ETAC)

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's 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.



Accreditation and Recognition

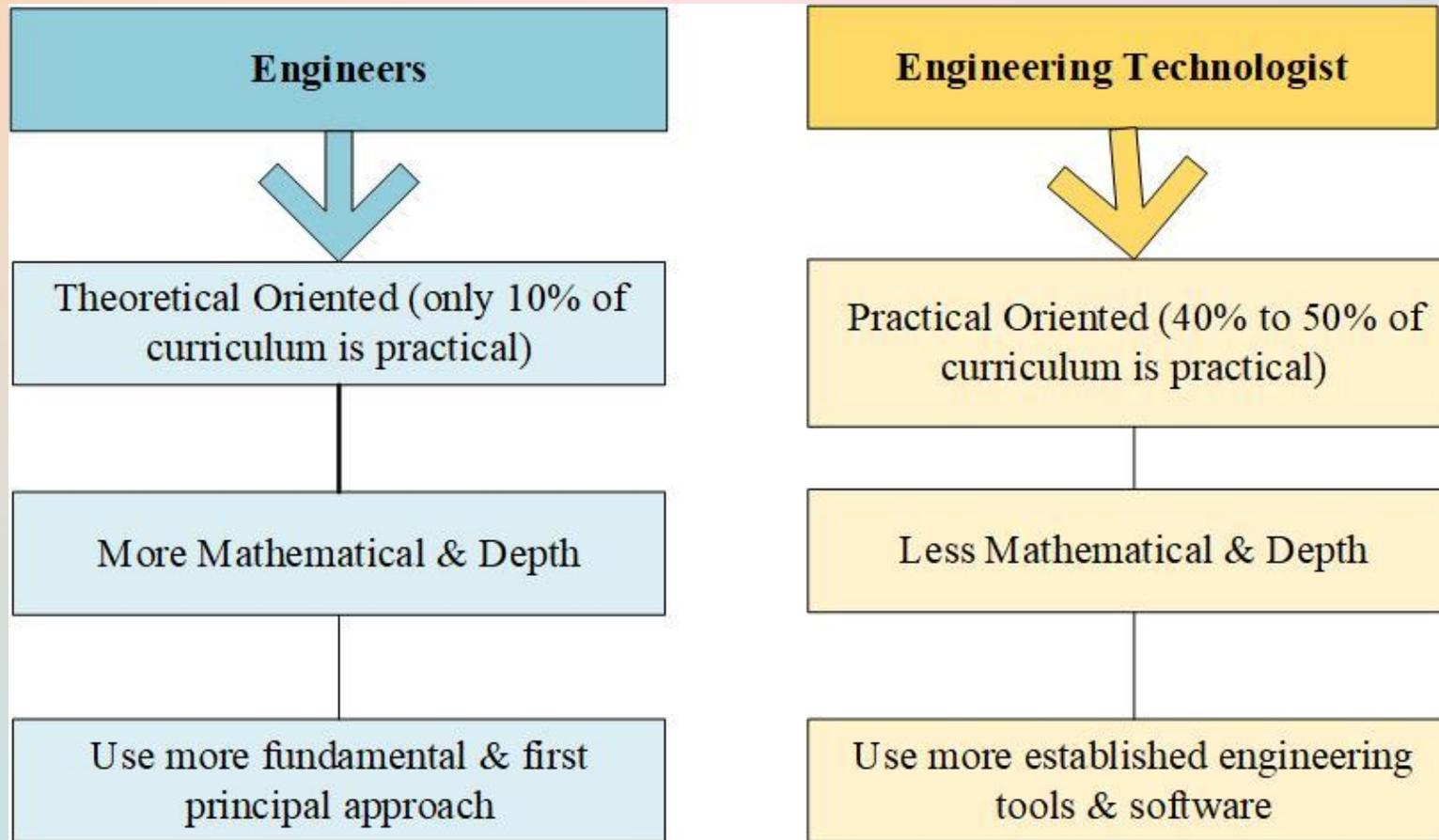
ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL (ETAC)

Two programme accreditation standards for use by Institutions of Higher Learning (IHLs) to meet the accreditation requirements namely:

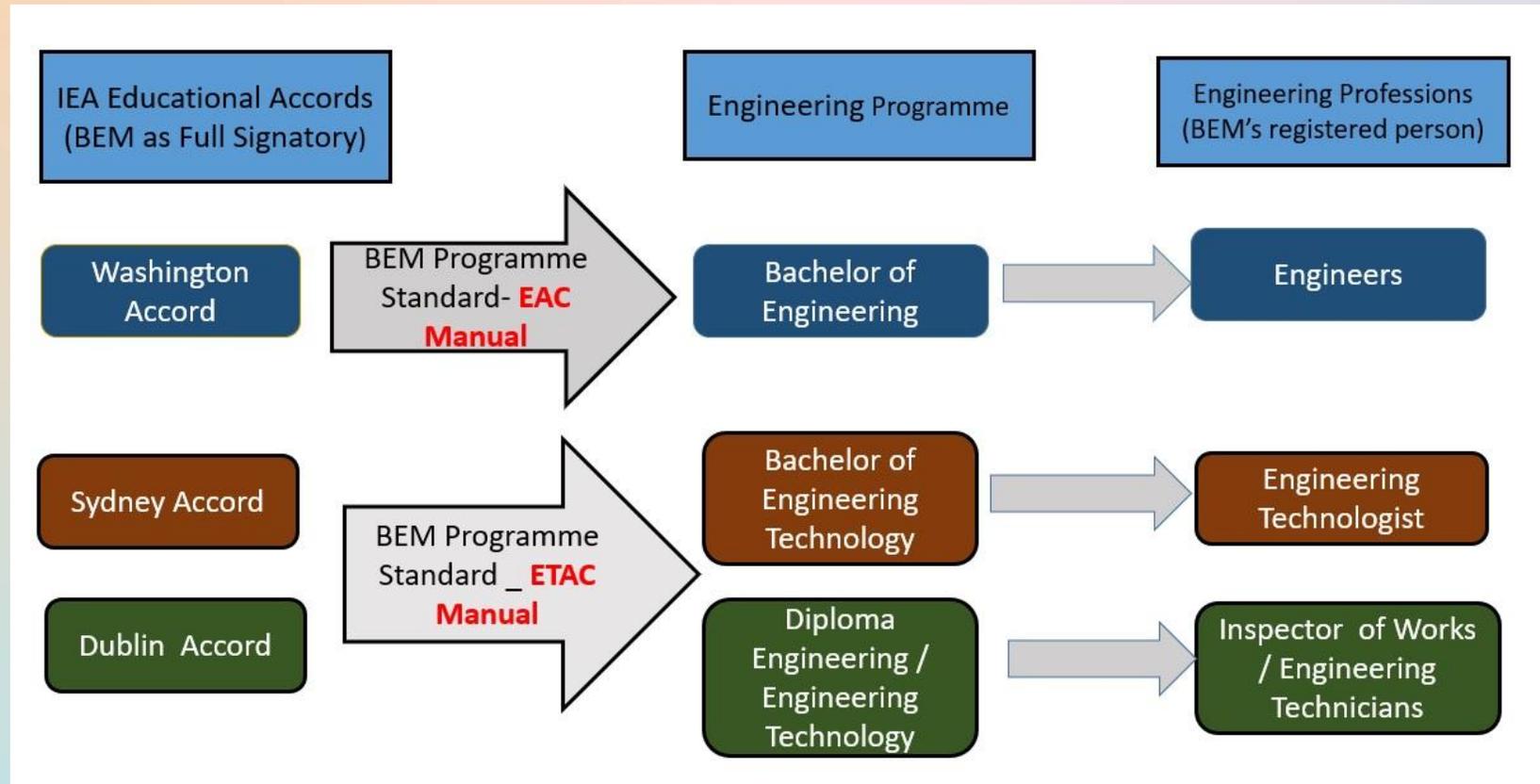
Engineering Technology Programme Accreditation Standard 2020. This standard is applicable for Bachelor of Engineering Technology programmes.

Engineering Technician Education Programme Accreditation Standard 2020. This standard is applicable for both Diploma of Engineering or Diploma of Engineering Technology programmes.





Difference in educational requirements for Engineers.

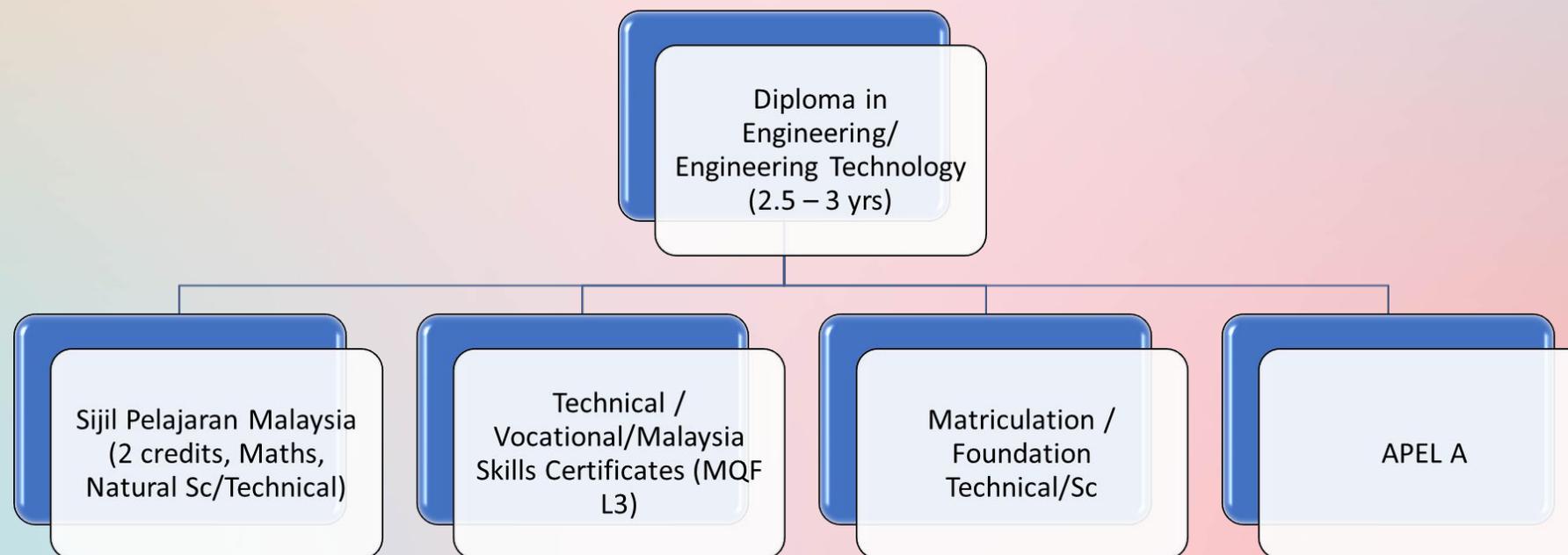


Mapping of IEA accords and BEM registered person



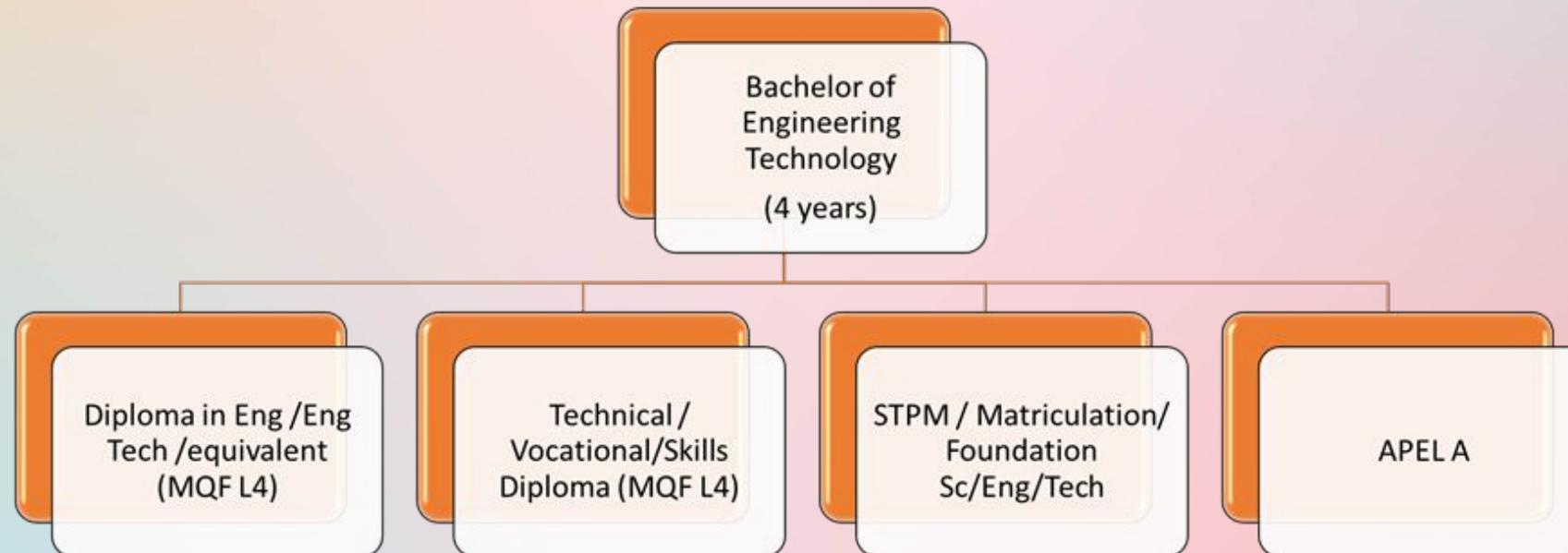
ACADEMIC PROGRAMME ENTRY QUALIFICATIONS (1)

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)



ACADEMIC PROGRAMME ENTRY QUALIFICATIONS (2)

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.



THANK YOU



Committed to Engineering Excellence

BOARD OF ENGINEERS MALAYSIA

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