LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

TECHNOLOGY AND TECHNICAL ACCREDITATION COUNCIL (TTAC)

TECHNOLOGY AND TECHNICAL ACCREDITATION MANUAL 2019

*Empowering **Technology** Education*

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Technology and Technical Accreditation Manual 2019 *

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PREFACE **PRESIDENT OF MBOT**

TAN SRI DATO' ACADEMICIAN (Dr.) Ts.
AHMAD ZAIDEE BIN LAIDIN FASc.
President
Malaysia Board of Technologists

Assalammualaikum Warahmatullahi Wabarakatuh.

Our world is currently being stormed with new and emerging technologies which cause Malaysia to require numerous flexible and highly skilled professionals that are able to adapt with the rapid changes. Having said that, Technologists and Technicians are the key players who will determine the success of Malaysia's vision towards the Fourth Industrial Revolution and high income nation. Hence, we should also aim to be among the top nations in the world with regards to the domestic economy, prosperity and innovation.

In Industrial Revolution 4.0 (IR4.0), the value of technology is highly emphasised. Forward-looking principles such as the Internet of Things (IoT), 3D printing, autonomous vehicle, biotechnology and nanotechnology are embedded within IR4.0. and will change the nature of jobs in Malaysia. Nevertheless, it has to be stated that technologies do not replace technologists, instead, they empower them to do their jobs. Technologists are human skills and characteristics that machines cannot replicate such as intelligence, creativity, and experience. This is the kind of mind-set we need to adopt.

MBOT must move faster so that we can equip our graduates in line with the country's aspirations. If things are not tackled accordingly and quickly, we would not be where we want to be in the future. Through the Technology and Technical Accreditation Council (TTAC), MBOT will evaluate the quality assurance of related technology programme as stipulated in the Technologists and Technicians Act 2015. Being involved in the educational ecosystem at early stage is very crucial to ensure that the technology programme offered by the Education Provider is in-line with the needs of industry and our nation.

I look forward to the support and cooperation from all to further develop MBOT and execute what has been charted. I appreciate the continuous support from everyone to work with MBOT so that it can leave a big impact to the nation as a whole.

PREFACE **CHAIRMAN OF TTAC**

Assalammualaikum Warahmatullahi Wabarakatuh.

Technologists and technicians are the pillars of strength who will determine the success of the Fourth Industrial Revolution (IR 4.0). It is imperative to ensure that the growth of these professions is being monitored and regulated properly at early stage. With the enormous wave of change which is currently hitting the world, Malaysia has to be ready to face the biggest challenge in moving towards the technology driven nation.

The approach in recognizing the Technology-Based profession has elevated the importance of technical and vocational training (TVET) and has increased the level of acceptance and demand of the industry towards a highly skilled and practically oriented workforce. MBOT has a major role in developing and professionalizing Technologists and Technicians besides getting them ready to face the rapid growth of technology especially while they are still in the education realm.

This manual aims to assist Education Provider in complying with MBOT's requirements in applying for professional accreditation. It is important to ensure that the programme offered by our Education Provider has the highest quality assurance, which in the end, will be able to enhance the capability and capacity of our graduates at both local and international level as well as in technology education, training and professional development. Through MBOT's accreditation, we hope that our Education Provider will be able to meet the supply and demand of the industry towards a highly skilled and practically oriented workforce in developing Malaysia towards a high income and technology driven nation.

Finally, I would like to express my appreciation for this comprehensive accreditation manual and special thanks to those who have participated in providing their knowledge, information and data in developing this manual.

PROFESSOR DATO' Ts. DR. ROSLI MOHD YUNUS
Chairman, Technology and Technical Accreditation Council (TTAC)
Malaysia Board of Technologists

PREFACE **REGISTRAR OF MBOT**

Ts. Mohd Nazrol bin Marzuke

Bismillahirrahmanirahim,

Assalamualaikum warahmatullahi wabarakatuh.

All praises to Allah for His blessing and grace, the Technology and Technical Accreditation Manual 2019 is successfully published.

Let me take this opportunity to congratulate everyone who have worked together by contributing their boundless energy, effort and ideas to make this manual a success. This manual book is significant as a reference for Education Provider (EP) to design and implement academic programs in technology and technical fields.

In order to empower Technologists, the manual is fundamental for all parties to generate complete information and knowledge regarding the accreditation. This effort is a profound initiative and action of the Technology and Technical Accreditation Secretariat (TTAS) aimed to providing guidance to EP on the development and implementation of academic programs.

Finally, it is our great hope that this manual can be fully utilized by EP as a constructive guide throughout the offering of academic programs at their respective institutions.

Thank you.

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PREFACE **DIRECTOR OF TTAS**

Assoc. Prof. Ts. Dr. Mohd Rusllim Mohamed

Assalamualaikum Warahmatullahi Wabarakatuh

Alhamdulillah the Technology and Technical Accreditation Council (TTAC) 2019 is finalised. We believe future education is moving towards flexible education and multidisciplinary based, therefore this manual demonstrates our aspiration towards the future by allowing flexibility to education providers in preparing a quality professional technology and technical education programme. A quality education programme as mentioned in this Manual's Philosophy should produce graduates who are able to uphold the dignity and reputation of their profession, as well as to execute their professional skills to the best of their ability with integrity to safeguard the public interest in the matters of safety and health. We thank you all stakeholders who have given tremendous efforts towards making this manual a reality.

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Acronyms

AP	-	Accreditation Panel
CQI	-	Continuous Quality Improvement
CT / Tc.	-	Certified Technicians
EP	-	Education Provider
GT	-	Graduate Technologists
JTC	-	Joint Technical Committee
MBOT	-	Malaysia Board of Technologist
MQA	-	Malaysian Qualifications Agency
MQF	-	Malaysian Qualifications Framework
OBE	-	Outcome – Based Education
PT / Ts.	-	Professional Technologists
QT	-	Qualified Technicians
SLT	-	Student Learning Time
SPM	-	Sijil Pelajaran Malaysia (Malaysian Certificate of Education)
SRR	-	Self Review Report
TTAC	-	Technology and Technical Accreditation Council
TTAS	-	Technology and Technical Accreditation Secretariat

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1.0 Technologists and Technicians Act 2015 (Act 768)

Technologists and Technicians Act 2015 (Act 768) was passed by the Parliament of Malaysia and gazetted to take effect on Aug 1st, 2015. It was instigated by the recommendation of the Tenth Malaysia Plan (10MP), which has identified the needs for setting up a professional body to register and recognise graduates of skills and technology. In addition, Act 768 is the only act that covers Technicians which is aimed at recognising them as professionals. This will consequently elevate their status.

2.0 Introduction to MBOT

Technology as defined by Collins mean "methods, systems, and devices which are the result of scientific knowledge being used for practical purposes". Meanwhile, Oxford defines technology as "the application of scientific knowledge for practical purposes, especially in industry". In a nutshell, based on both definitions, Technologists can be viewed as professionals who practices their knowledge based on the usage of tools and the implementations of systems.

MBOT was officially formed in November 2016 as a professional body to award Professional Recognition to Technologists and Technicians. This takes effect after the Parliament of Malaysia gazetted the Technologists and Technicians Act 2015 (Act 768) in 2015. It should be noted that, it is important to recognise the roles and responsibilities of technologists and technicians in Malaysia, as the nation gears towards the Fourth Industrial Revolution.

Under section 21(1) and 22(1), Technologists are identified as any person with a bachelor degree recognised by the Board while Technicians are acknowledged as any person with a certificate or relevant qualifications recognised by the Board. MBOT has opened membership registration for technologists and technicians in two entry level categories namely Graduate Technologist (GT) for Bachelor degree holders in Technology and Qualified Technician (QT) for advanced diploma, diploma and skill certificate holders.

Technologists and technicians who register with MBOT will have the opportunity to be recognised as a Professional Technologist or Certified Technician in accordance to their expertise. Figure 1.1 illustrates MBOT's continuous pathway for technologists and technicians.

Under the section of 19 (Act 768), a Professional Technologist shall be entitled to approve and certify the manner or conduct of technology services to be carried out, and uses abbreviated title "Ts." or P.Tech. Conversely, under the section of 20 (Act 768), a Certified Technician shall be entitled to approve and

certify the manner or conduct of technical services to be carried out, and uses abbreviated title "Tc." or C.Tech. Both Ts. and Tc. are entiltled to use stamp as determined by the Board.

The scope of services for the Technologists is spelled out in Section 16(b) which involves any operations relating to product development, manufacturing, testing, commissioning and maintenance. On the other hand, section 16(a) outlines the scope of services for Technicians that includes any operations relating to product testing, commissioning and maintenance.

The functions of MBOT are to

i. recognize Ts. and Tc. as professionals;
ii. keep and maintain the Register of Technologists and Technicians under Section 17 of Act 768;
iii. provide facilities for the promotion of education and training as well as to hold or cause to be held, professional development programmes for registered persons to further enhance their knowledge relating to their professions;
iv. conduct assessment or to create assessments to be conducted by an institution approved by the Board for admission to the profession;
v. determine and regulate the conduct and ethics of the technologist and technician professions;
vi. carry out all such acts and do all such things that as may appear necessary to the Board to carry out the provisions of Act 768.

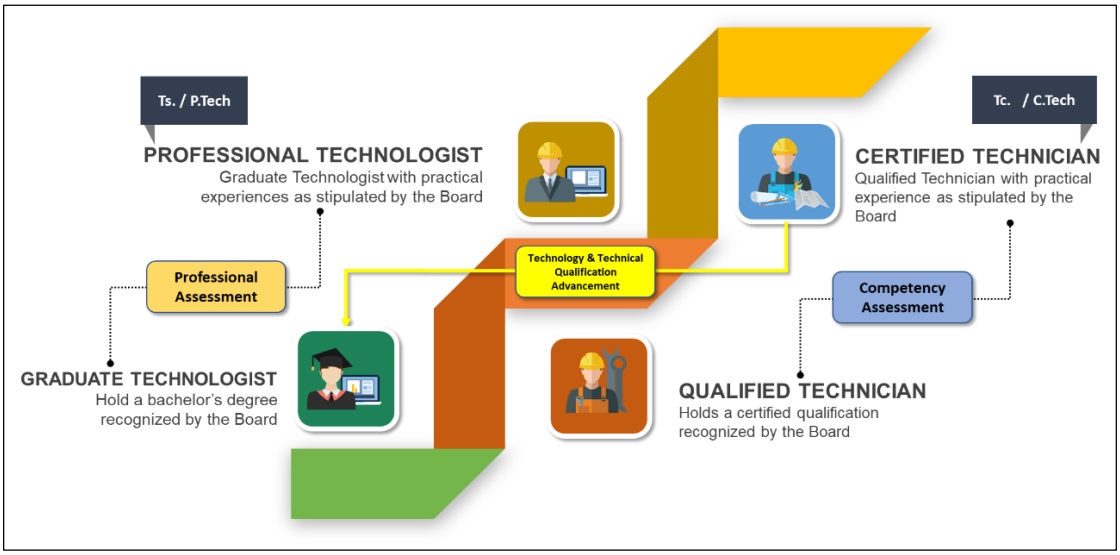

Figure 1.0 MBOT's continuous pathway for technologists and technicians

3.0 Technology and Technical Accreditation Council (TTAC)

Section 6 (2) (g) of Act 768 mentions that the Board is empowered to set up a council to evaluate the quality assurance for the programmes in Technology. Thus, MBOT agreed to set up TTAC on 13th October 2016 to act as Joint Technical Committee (JTC) to fulfil and complement Act 679 - Malaysian Qualifications Agency Act 2007 under Section 51. (1).
The members of TTAC consist of:

- Chairman;
- Representative from MBOT;
- Representative from related Ministry;
- Representative from Learned Society;
- Representative from Malaysian Qualification Agency;
- Representative from the Industry;
- Academia; and
- Any representative to be determined by the council.

The main function of TTAC is to evaluate the quality assurance of technology programmes offered by Education Providers. TTAC aims to uplift the respective programme to be a professional programme which provides multiple benefits to the graduates. The involvement of Industry and professionals from other sectors is expected to close the demand and supply gap in all programmes accredited by MBOT. The other functions of TTAC are to:

- establish and re-condition accreditation policies and criteria;
- acknowledge the extensive guidelines and processes for accreditation goals;
- supervise the operational regulations and assign appraisal experts panel;
- accept assessment reports on Technology and Technical programmes and indicate its accreditation evaluations;
- take note of any complaints or appeals with respect to the accreditation procedure and to any changes in the proposal;
- monitor the evolution and operation of accreditation in other countries and make recommendations to the Board accordingly;
- report accreditation operation as appropriate and recommend changes to the Board's policy related to the accreditation;
- enhance positive developments and excellent practices in Technology and Technical education;
- suggest public statements to the Board that are relevant to Technology and Technical education; and
- become a Joint Technical Committee with the Malaysian Qualifications Agency (MQA) pursuant to section 51 of the Malaysian Qualifications Agency Act 2007 (Act 679) to coordinate the accreditation process for the Technology and Technical programmes.

4.0 TTAC Manual Philosophy

TTAC Manual is a guide for Education Providers (EPs) in offering any technology or technical education programmes. The Manual covers a broad spectrum of education programmes either fully academically-inclined programmes, mix of academic and practical-oriented programmes, or fully practical-oriented programmes. Furthermore, the Manual represents aspirations of MBOT to empower Technical and Vocational Education and Training (TVET) in Malaysia by providing the general guidelines for EPs to produce quality and competence workforces to local or international stakeholders. The Manual is prepared by taking into account the nature of future education such as multidisciplinary based, organic curriculum and flexible education; therefore, EPs are autonomous in designing their own programmes to meet the stakeholders' expectations.

A quality educational programme should have a proper curriculum structure, learning processes and proven assessment mechanisms to ensure all the intended outcomes and technology / technical services are met. A good quality programme should produce graduates who are able to uphold the dignity and reputation of their profession, as well as to execute their professional skills to the best of their ability with integrity to safeguard the public interest in the matters of safety and health. The system employed by any EPs should ensure the implementation of good quality assurance throughout the educational processes in an effort to maintain the highest quality graduates. Continuous quality improvement should become a part of the culture for sustainability of the programme as well as in keeping abreast with the real-life technology advancement.

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5.0 Accreditation Objective and Benefits

Quality assurance is an open-ended process in which all parties involved are accountable for it. Thus, it is important for MBOT to continuously review its quality assurance practices in order to ensure their relevancy, reliability, adaptability and efficiency to respond to the progressively changing higher education environment. Accreditation is a status or an achievement as a result of the quality assessment exercises conducted by MBOT with the objective to ensure that the programme offered by EPs will meet the minimum requirement of technology based education. Besides, accreditation will ensure that the graduates for the accredited programmes comply with the attributes required as professionals in the fields. There are two levels of programme accreditation, namely:

- Provisional Accreditation; and
- Full Accreditation.

The main objective of the Provisional Accreditation is to validate the minimum requirements to conduct a programme by an EP in relation to the nine aspects of assessment, particularly the programme's curriculum framework. Meanwhile, a site visit may be conducted in order to affirm the appropriateness of the facilities at the respective institution,. Also, in order for an institution to be authorized in offering a programme, the report for the Provisional Accreditation exercise is required.

The primary purpose of the Full Accreditation is to ensure that the programme has achieved the set of standards as presented in the Code of Practice, which are in line with the accreditation criteria outlined by MBOT and Malaysia Qualification Framework (MQF). Full Accreditation is carried out by the external and independent auditors who are the Panel of Assessors representing MBOT. They perform audits on the Programme Information and Self-Review Report provided by the institution. As such, Full Accreditation serves as a guarantee or an assurance of the quality of academic programmes accredited by MBOT

The main benefit for a programme accredited by a professional body like MBOT is the status of its professional programme. The graduates for the programmes will be recognised by MBOT upon their graduation as GT or QT. The benefits of having an academic programme being accredited among others are:

- Public Service Department (PSD) utilizes the status of the accreditation in verifying the requirements in public services recruitment;
- Accreditation is used by professional bodies such as MBOT to acknowledge graduates for an enrolment as a Ts. and Tc. as specified in Act 768;

- Students in the accredited programmes are eligible for loan or funding from various organizations for example the National Higher Education Fund (PTPTN) or Majlis Amanah Rakyat (MARA);
- Conferment of degree at higher institutions are legitimate and the attainment of credit transfer is permissible, although the conclusive decision depends on the corresponding institution;
- Graduates may gain employment in the public sectors. Apart from that, employers in the private sectors also acknowledge accredited programmes in selecting graduates for recruitment; and
- Institutions may franchise their accredited programmes to other institutions, subject to definite conditions,

6.0 Operation Definition

In general, the operation definition for Technology are as follows:

- Cutting edge machinery or equipment or technique
- Created from systematic application of scientific and technical knowledge for practical purposes including but is not limited to the modernization, miniaturization, integration, and computerization of electronic, hydraulic, pneumatic, laser, mechanical, robotics, nuclear, chemical, telecommunication, and other technological applications
- Enhance productivity or way of life in areas including but not limited to manufacturing, communications, medicine, bioengineering, and commerce

Programme criteria for Technology and Technical offered by EP are:

- Structured learning or exercise
- Student's exposure to use of high technology
- Produces high skilled and competent graduates who are competitive

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7.0 Different Nature of Education Programme

Malaysian Qualification Agency (MQA) was established in 2007 under the Malaysian Qualification Agency Act 2007 (Act 679) to implement Malaysian Qualification Framework (MQF). It should be noted that prior to being approved for implementation, the MQF has been benchmarked against the main qualifications framework worldwide such as those of England, Wales and Northern Ireland, Australia, New Zealand and Europe as well as United Nations Educational, Scientific and Cultural Organization (UNESCO) framework. Therefore, MBOT as a professional body established under the Technologists and Technicians Act 2015 (Act 768), takes it as the basis to acknowledge the approved academic qualifications and levels as indicated in the MQF.

As stated in the MQF, "Qualifications are certificates, diplomas or degrees that are awarded by any competent authority, having affirmed that one has been successful in completing the study at the determined standard, and has satisfied the determined level of achievement and is able to take on a role, duty or work. Qualifications indicate positive achievement of learning outcomes, not as compensation as a result of failure or coincidence". Moreover, MQF has also determined the eight levels of education pathways that link qualifications systematically through a minimum student learning time and credit hours system as well as the general expectations of learning outcomes.

MBOT acknowledges the interest of EPs to introduce a hybrid programme constitutes of a discipline-based and technology elements in their curriculum structure. Based on the abovementioned MQF qualifications and levels, it should be noted that MBOT would uphold the facts of pre-determined national education system, therefore no different qualifications between the programmes that offer pure discipline-based curriculum, hybrid discipline-based and technology curriculum, or pure technology-based curriculum. For that reason, all stakeholders should accept the facts that no substandard treatment must be allowed for different implementation in curriculum structures since the qualifications and levels are already pre-determined by the MQF.

In this case, MBOT puts a firm belief in the different implementations of the curriculum structures which are meant for the different job scopes. Hence, a programme should put emphasis in using cutting-edge machineries or equipment or techniques in structured learning methodology in order to produce highly skilled and competent graduates of the latest technology and who are adaptable to the new and emerging technology.

For pure discipline-based programmes, the programmes should place a strong emphasis on fundamental knowledge of science and mathematics. As the approach to the programme mainly focuses on theoretical elements, it is expected that students will develop a very strong fundamental knowledge of science and mathematics in a way that they would build their expertise in the design and development of products, processes or systems that may enhance the living standards, productivity and quality of life.

On the other hand, hybrid discipline-based and technology programmes require the application of scientific and fundamental knowledge and methods within the discipline, combined with technical skills in support of the discipline-based activities. As the concept applies, this type of programme is oriented towards application, and it provides students with mathematics and science courses as well as a qualitative introduction to discipline-based fundamentals and applied sciences. Students are exposed to almost similar courses to those of the pure discipline-based programme curricula but there will be a different emphasis given on the distribution of theories and technical skills. In short, the approach is typically application-oriented, but contains somewhat less theoretical elements as compared to the pure discipline-based counterparts.

Finally, for pure technology-based programmes, the emphasis is placed on the application of scientific knowledge and methods for practical purposes in specified industry. It is expected that the nature of such programme is geared towards product development, manufacturing, testing, installation, commissioning and maintenance. Students are exposed to the theories and technical skills to execute the tasks in the relevant sectors. The theoretical components can either be stand alone or embedded within certain courses. Typically, this type of programme is application-oriented, and it emphasises techniques to function in executing profession-based task.

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8.0 Programme Nomenclature

8.1 Use of term 'Technology'

The term of 'Technology' shall be used in the programme nomenclature. Exception is given to educational programme with nomenclature that reflect to technology itself or has been widely used, for example 'Computer Science', 'Renewable Energy', 'Cyber Security', 'Material Science'.

Programmes utilizing the terms of 'Discipline-based & Technology' in the programme nomenclature under the field of MBOT provision may apply to TTAC MBOT for accreditation of the programmes, subject to compliance with the requirements specified by MBOT.

The programmes which are classified within the pure-discipline-based programme or that use other term than 'Technology' in the programme nomenclature, can apply to TTAC MBOT for accreditation of the programme, subject to compliance with the requirements specified by MBOT.

8.2 Level of Programme

The level of programme refers to the level of an academic programme offered by EPs based on MQF.

8.3 Programme Discipline

The programme discipline refers to the general area of academic programme that reflects locally, internationally or work profession.

8.4 Programme Specialization (If any)

The programme specialization refers to the sub-fields of the academic programme.

8.5 General Guideline

8.5.1 The title of a particular programme must take into consideration the breadth of professional or employment requirements for the particular title and/or descriptors.

8.5.2 Nomenclature can be based on broad-based or specialization depending on the preferences of EPs based on the stakeholders' input.

8.5.3 The EPs' name should not be part of the programme nomenclature.

8.5.4 The programme nomenclature at level 6 MQF in Bahasa Melayu preferable to use 'Sarjana Muda' rather than 'Bacelor' or 'Ijazah'.

8.5.5 The term 'Kepujian' or Honours (Hons.) can only be used for the programmes at level 6 MQF

8.5.6 The pure academic programmes shall possess disciplines such as mechanical, electrical or, food

8.5.7 The broad-based programmes with single major, should comprise a minimum of 70% of technology fields or technology competency for example :

Table 1.0 Example of the programme nomenclature

MBOT Technology Field	Technology field	Technology Competency
IT	Bachelor of Computer Science	Bachelor of Artificial Intelligence Technology
	Diploma in Information Technology	Diploma in Networking Technology
	Diploma in Software Engineering	Diploma in Software Testing Technology
	Bachelor of Information System Technology	Bachelor of Web Development Technology
ME	Bachelor of Manufacturing Technology	Bachelor of Machining Technology
	Diploma in Mechanical Technology	Diploma in Metal Fabrication Technology
	Bachelor of Mechatronics Technology	Bachelor of Robotics Technology
FT	Diploma in Food Technology	Diploma in Food Processing Technology
AT	Diploma in Automotive Technology	Diploma in Automotive Bodyworks Technology
EE	Bachelor of Electrical Technology	Bachelor of Electrical Systems Maintenance Technology
	Diploma in Electronics Technology	Diploma in Autotronics Technology
CM	Bachelor of Applied Science	Bachelor of Applied Science Chemical Technology

8.5.8 The programmes with specialization, should comprise 25-30% of the specialization courses and the specialization fields should be mentioned in the bracket. For example; Bachelor of Computer Technology

(Software Development), Diploma in Electronic Technology (Microelectronics).

8.5.9 The programmes with double major disciplines should comprise 50% for each component and should use the term 'AND" to indicate the double major discipline. For example; Bachelor of Computer Technology AND Manufacturing Technology.

8.5.10 The programmes with major-minor discipline should comprise 25-30% of the second discipline and should use the term 'WITH' to indicate the major-minor discipline. For example; Bachelor of Computer Technology WITH Biotechnology.

8.6 Academic Programme with Collaboration

For the collaboration programme, EPs should not use "in collaboration" or in Bahasa Melayu "dengan kerjasama" in the nomenclature of programme. The wording should be stated in the academic transcript.

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9.0 Requirements and Accreditation Criteria

9.1 Criteria 1: Programme Design and Delivery

9.1.1 Education Provider Vision and Mission

Programmes applying for accreditation through MBOT shall have a clear statement of EP's vision and mission. The purpose of having this clear vision and mission is to ensure that the EP has a future direction and how the EP defines its strategies and objectives to position itself in providing the best education and training to the market.

9.1.2 Programme Educational Objectives (PEOs)

PEOs are broad statements that describe what the graduates ultimately will become in their career and professional life after several years of graduation. The PEOs are the specific goals of the programme and should align with the EP's vision and mission.

In addition, the establishment of PEOs must demonstrate the interest of the programme's stakeholders

Therefore, to ensure the effectiveness of the objective, EP must have a clear key performance indicator (KPI) for each PEO, agreed through a proper consultation with the stakeholders.

This is crucial to ensure that the programme is capable to produce technologists or technicians, which meets the expectation of the stakeholders.

The programmes shall demonstrate mechanism to monitor and evaluate the PEOs attainment.

9.1.3 Programme Relation to EP's Vision and Mission

Programmes applying for technology or technical accreditation shall have a statement illustrating their consistency with the EP's Vision and Mission. This statement is very important to ensure sustainability of the programmes in line with the strategic move of the EP.

9.1.4 Graduate Attributes (GA)

The programmes shall have well documented graduate attributes to describe the abilities that students should portray upon accomplishment

of the programme which covers body of knowledge and attitudes that the future technologist or technician will achieve after going through the respective programme.

The graduate attributes reflect the commonly known Programme Learning Outcomes (PLOs) which become the minimal intended targets of students' competencies to perform upon completion of a programme.

The programmes shall demonstrate some forms of mechanisms to monitor and evaluate the GA attainment.

Table 2.0 shows the expected generic graduate attributes for students to attain at the end of the programme to become a GT or QT with respect to MQF.

EP shall publish all the intended GA to all stakeholders and consider designing the programmes with adequate assessments so that it will be transparent in meeting the expectation of stakeholders. Evidence of stakeholders' involvement shall be provided in generating the programme GA.

It should be noted that based on Act 768 – Technologists and Technicians Act, GT refers to a person who holds a bachelor's degree recognised by the Board upon meeting the criteria determined by the Board. On the other hand, QT refers to a person who holds a certificate recognised by the Board upon meeting the criteria as determined by the Board. With respect to QT, MBOT has agreed to recognise Advanced Diploma, Diploma and Certificate Level 3 MQF to be registered as QT upon meeting the criteria as determined by the Board.

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Table 2.0 Generic graduate attributes of students upon completion of programme

Domain	Graduate Technologist	Qualified Technician		
	Bachelor Degree	**Advanced Diploma**	**Diploma**	**Certificate**
PLO1 - Knowledge *(Cognitive Domain)*	Apply the knowledge of technology fundamental to **broadly-defined** procedures, processes, systems and methodologies in ***the field of study*.**	Possess relevant knowledge of technology fundamentals on **extended well-defined** procedures and practices in ***the field of study.***	Possess relevant knowledge of technology fundamentals on **well-defined** procedures and practices in ***the field of study.***	Possess basic knowledge of technology fundamentals on **routine** procedures and practices in ***the field of study.***
PLO2 - Practical Skills and High Technology *(Psychomotor Domain)*	Propose and employ current tools and techniques to resolve **broadly-defined** problems.	Propose and employ current tools and techniques to resolve **extended well-defined** problems.	Propose and employ current tools and techniques to resolve **well-defined** problems.	Propose and employ current tools and techniques to resolve **routine** problems.
PLO3 – Analytical, Critical Thinking and Scientific Approach *(Cognitive Domain)*	Demonstrate deep investigative and significant thinking abilities to solve **broadly-defined** problems in the field of study.	Establish investigative and significant thinking abilities to resolve **extended well-defined** problems in the field of study.	Establish investigative and significant thinking abilities to resolve **well-defined** problems in the field of study.	Establish basic investigative and significant thinking abilities to resolve **routine** problems in the field of study.
PLO4 - Communication Skills *(Affective Domain)*	**Communicate effectively** and flexibly in oral and written language for social, academic and professional purposes.	**Communicate** and explain in details a wide range of viewpoints for social, academic and professional purposes.	**Communicate** and explain clearly several viewpoints for social, academic and professional purposes.	**Communicate** and describe simple tasks within familiar areas and the immediate needs.

PLO5 – Social Responsibility in Society and Technologist Community *(Affective Domain)*	Illustrate the understanding of corresponding issues related to the society and the subsequent responsibilities to the **broadly-defined** technology practices.	Illustrate the understanding of the issues related to the society and the subsequent responsibilities appropriate to the **extended well-defined** technology practices.	Illustrate the understanding of the issues related to the society and the subsequent responsibilities appropriate to the **extended well-defined** technology practices.	Illustrate the understanding of the issues related to the society and the subsequent responsibilities appropriate to the **routine** technology practices.
PLO6 - Lifelong Learning and Information Management *(Affective Domain)*	Acknowledge the requirement of professional establishment and to employ independent continuing learning in **specialist technology.**	Acknowledge the requirement of career establishment and to employ independent continuing learning in **specialized technical knowledge.**	Acknowledge the requirement of career establishment and to employ independent continuing learning in **specialized technical knowledge.**	Acknowledge the requirement of career establishment and to employ continuing learning.
PLO7 - Technopreneurship and Management Skills *(Affective Domain)*	Illustrate consciousness of management and technopreneurship routine in real perspective.	Illustrate consciousness of management and technopreneurship routine in real perspective.	Illustrate consciousness of management and technopreneurship routine in real perspective.	Illustrate an consciousness of management and technopreneurship routine in real perspective.
PLO8 - Ethics and Professionalism *(Affective Domain)*	Illustrate ethical awareness and professionalism.	Illustrate ethical awareness and professionalism.	Illustrate ethical awareness and professionalism.	Illustrate ethical awareness and professionalism.
PLO9 - Teamwork and Leadership *(Affective Domain)*	Illustrate leadership character, mentoring and work efficiently in **diverse teams.**	Illustrate leadership character and work efficiently in **diverse technical teams.**	Illustrate leadership character and work efficiently in **diverse technical teams.**	Illustrate leadership character and work efficiently in a **technical team.**

9.1.5 Technology / Technical Services

Section 16 of Technologists and Technicians Act (Act 768) states that the Board shall determine the provisions of the Technology and Technical services under the Board. Table 3.0 outlines the key Technology / Technical Services that need to be covered within each programme.

It is required for each bachelor degree programme which is at level 6 MQF, denoting the minimum criteria of GT, to address 5 technology services. Meanwhile, the programmes which are at level 3, 4 and 5 MQF, signifying the minimum criteria of QT, should address 3 technical services. The respective requirement is stipulated in Table 3.0.

Table 3.0 Technology / Technical Services

Technology / Technical Services	
Technologist	**Technician**
1. Development	N/A
2. Manufacturing	N/A
3. Testing	1. Testing
4. Commissioning	2. Commissioning
5. Maintenance	3. Maintenance

The technology and technical services listed in Table 3.0 serve as a guide for EPs to provide the best competency and skills training with respect to the specific field of technology and technical services, as agreed by Technology Expert Panels (TEP) during the engagement sessions. The services are expected to be included in the curriculum design. The EPs are, however, given the flexibility to modify the curriculum with strong evidence and justification, particularly with respect to technology advances and coverage of the services, and supported by authorised, core industries / agencies. Nevertheless, TTAC MBOT reserves the right to advice EPs and make changes where appropriate. Refer to Appendix A.

9.1.6 Programme Development, Design and Delivery

The Programme development must effectively develop the following processes (not limited to):

1. Market survey and analysis
   Needs analysis must be carried out through surveys and data analytics from respective agencies to ensure the programme meets

the demands of stakeholders and to guarantee its long-term sustainability of the programme.

2. Engagement with stakeholders
   Evidence of the stakeholders involvement in the curriculum design, delivery and assessment is required to ensure the programme meets the stakeholders' expectations and to continuously improve the key aspects of the programme.

3. Programme design and delivery
   Technology or Technical programmes seeking for accreditation must establish a clear process in designing, reviewing and evaluating the programme structure. It is required for the content and structure to continually keep abreast with the most current technology advances, professional practices and international best practices in the field, and with the needs of stakeholders.

   It is also important for EPs to consider, design and offer programmes which are corresponding to future-ready jobs.

EPs must ensure that each programme delivery adopts various teaching-learning methods that are appropriate to ensure the achievement of the programme GAs and TPs. The programme should demonstrate a proper engagement between educators and students to ensure students take responsibility for their own learning.

Prior to conducting the programme and throughout the delivery of the programme, EPs must ensure adequate resources are in place to guarantee the achievement of the programme GAs and TPs, as well as to provide a conducive learning environment which nurtures scholarly, creative and professional development.

Table 4.0 shows the minimum requirement of a programme structure of Technologist or Technician with respect to the MQF levels.

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Table 4.0 Minimum requirement of a programme structure

Items	Bachelor Degree (Level 6 MQF)	Advanced Diploma (Level 5 MQF)	Diploma (Level 4 MQF)	Certificate (Level 3 MQF)
Student Learning Time, SLT-based Credit Hours++	Minimum 120	Minimum 40	Minimum 90	Minimum 60
Studies Duration	Minimum 3 years	Minimum 1 year	Minimum 2 years	Minimum 1 ¼ years
Technology Component Consists of Common Core, Discipline Core, Final Year Project, Industrial Training related to field of study	Minimum 80 credit	Minimum 25 credit	Minimum 60 credit	Minimum 30 credit
Theory / Knowledge • Technology Component only • SLT / Credits	Minimum 40%	Minimum 30%	Minimum 20%	Minimum 20%
Practical Component • Technology Component only • SLT / Credits	Minimum 40%	Minimum 60%	Minimum 60%	Minimum 60%
General Component Consists of MPU courses, EP Compulsory courses and others.	The remaining credit	The remaining credit	The remaining credit	The remaining credit

++ An education programme which combines the components of "discipline-based & Technology" programmes in its programme nomenclature is expected to have higher SLT-based credit hours and extended tenure years compared to an education programme with "Technology"-based only.

All programmes at MQF level 4 and above is required to include Final Year Project in its curriculum as a means for students to develop the capacity for independent analyses and judgements. An industry-based project should be prioritized in selecting the title for the Final Year Project. While doing the project, students are expected to utilise the latest and relevant techniques and tools practised in the industry.

All programmes shall have an Industrial Training component to expose the students to the real industrial practice including the managerial, safety, legal and ethical aspects at work. The type of industry and the duration of industrial training should be appropriate to the needs of the programme. Typically, 2 weeks per credit is allocated for the industrial training. A

minimum of 8 weeks of industrial training is allocated for students to gain industrial exposures and experiences which consequently may enhance their technical and soft skills. Nevertheless, it is highly recommended for the duration of the industrial training for bachelor degree programmes (Level 6 MQF) to be around 1 semester or an equivalent to six consecutive months, whereas for diploma programmes (Level 4 MQF) the recommended duration is three consecutive months.

The industrial mode / Apprenticeship is where students are placed at industries during the study period and they are expected to learn theories through industry-guided real-life work learning activities. Programmes adopting the industrial mode / apprenticeship must ensure that the students' placement is appropriate and their mentors at the industry are well-trained so that the programme learning outcomes can be achieved. The evaluation of the attainment of the outcomes should be conducted via appropriate assessments. It is suggested that the credits allocated for this mode to be at a range of 24 – 40 credits of student learning time (SLT) per year or 48 – 60 credits SLT for 2 years implementation.

It is permitted for the EPs opting for the Industrial mode / apprenticeship to conduct theoretical learning instructions and assessments on a weekly basis or block modules for the students prior to attending the industry-guided real-life work learning activities at industries. However, this has to be in consideration of students' welfare and learning processes in achieving the intended learning outcomes.

9.1.7 Non-Technologist Bridging Programme

For non–technologist graduates who wish to obtain a recognition from MBOT, they can go through a bridging programme through a technology-based programme recognised by the MBOT as shown in Table 5.0:

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Table 5.0 Bridging programme structure for Non-technologist graduate

Non – Technologist Programme	MBOT Technology-based Programme	MBOT Recognition
Bachelor Degree Minimum 120 Credits Eg: Bachelor Degree in Business Administration	• Graduate Diploma (MQF Level 6) recognised by the MBOT – Total 66 Credits • Minimum 33 credits of Technology component • Minimum 40 % Practical Component • Complies with 5 Technology / Technical Services for the programme	Graduate Technologist (GT)
Advanced Diploma or higher Minimum 40 Credits Eg: Advanced Diploma in Fashion Design, Bachelor Degree in Business Administration	• Graduate Certificate (MQF Level 6) recognised by the MBOT – Total 36 Credits • Minimum 18 credits of Technology component • Minimum 60 % Practical Component • Complies with 3 Technical Services for the programme	Qualified Technician (QT)
Diploma Minimum 90 Credits Eg: Diploma in Business Administration	• Advanced Diploma (MQF Level 5) recognised by the MBOT – Total 40 Credits • Minimum 20 credits of Technology component • Minimum 60 % Practical Component • Complies with 3 Technical Services for the programme	Qualified Technician (QT)

A Non Technologist Bachelor Degree Graduate can opt to take Technology-based Graduate Certificate certified by MBOT but can only be recognised as Qualified Technician (QT).

9.2 Criteria 2: Student Assessment

Assessment indicates various methods or tools utilized in evaluating, measuring, and documenting the academic readiness, skill acquisition, learning progress, or educational requirements of the students. The assessments may be classified into two types which are Continuous

Assessment and Final Assessment. The final assessment shall be evaluated individually.

9.2.1 Relationship between Assessment and Graduate Attribute

The assessment methods should be mapped to Graduate Attributes clearly and precisely.

9.2.2 Assessment Regulation and Policies

The EPs shall clearly define the assessments' regulation and policies such as the mechanisms to provide feedback to the students' achievement and performance, the management of the final examination processes including but not limited to vetting and moderation, input from External Advisor, strong room regulations, grading systems, appeal mechanisms, endorsement of results, and attainment of learning outcomes, an academic regulation handbook, records reporting students' assessments, and students' performance feedback.

9.2.3 Assessment Process

The EPs shall clearly describe the process of designing, implementation, evaluation and review of the assessment methods as displayed in Figure 2.0. The process shall involve the respective internal and external stakeholders . The EPs should clearly state the mechanisms to review the assessment methods such as the appointment of respective committees, data collection, analysis and documentation processes.

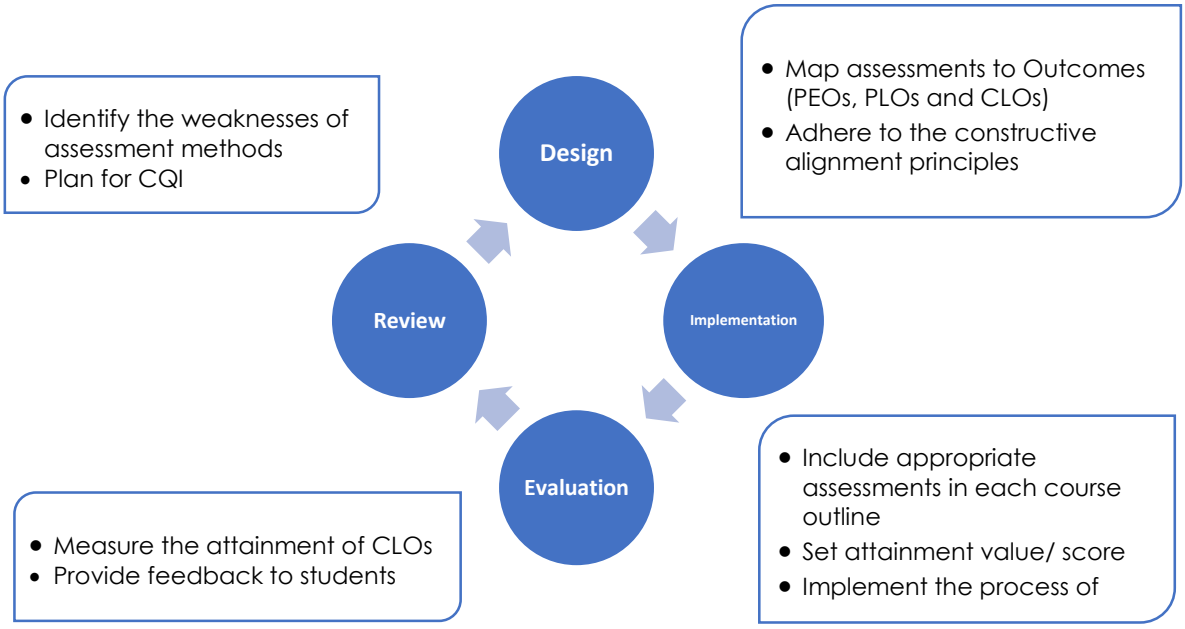

Figure 2.0 : Assessment Development Process

The principles of constructive alignment should be adhered to in defining learning outcomes and aligning the outcomes with assessments, teaching strategies and learning activities.

9.2.4 Assessment Methods

The assessment methods must signify the progress as well as the final evaluation of each course. The combination of multiple evaluation approaches must indicate the accomplishment of the learning outcomes.

For any group activities, the number of students shall not exceed 4 students per group. Fairness mechanisms should be in place for any group activities to encourage individual learning.

The assessment methods across the programme shall be evaluated through:

i. Examination
   - Written examination such as quizzes, test, mid-term examination, and final examination
   - Oral examination
   - Practical examination

ii. Coursework
   - Assignments
   - Report
   - Case studies
   - Laboratory
   - Mini project

iii. Project (Individual and/or Group)
   - Report
   - Group Activities
   - Presentation
   - Final year project
   - Capstone project

iv. Industrial Training

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9.3 Criteria 3: Students Selection and Support Service

Administration of student selection shall clearly be defined with understandable and legitimate policies and procedures made available for application and appeals.

EPs shall have a mechanism for academic advice where; counselling and support services must be reachable and responsive to students' requirement. Support services for students should not be limited to only formal academic requirements, but should also include extracurricular provisions for cultural, sports and leisure and other appropriate activities.

9.3.1 Students Selection

Criteria and policy of students' selection shall clearly be specified and appropriate to the EPs and its respective programme. The EPs shall fairly apply the students' selection policy and well communicated with the public.

The minimum student entry requirement for technology programmes are as follows:

Certificate in Technology or equivalent (Level 3 MQF)

i. Pass SPM/SPMV or its equivalent with at least ONE (1) credit in any subject; or
ii. Pass UEC with at least Grade B in ONE (1) subject; or
iii. Pass O-level with at least Grade C in ONE (1) subject; or
iv. Pass SKM level 2 in related disciplines AND pass SPM; or
v. Other recognised qualifications or its equivalent.

Diploma in Technology or equivalent (Level 4 MQF)

i. Pass SPM/SPMV or its equivalent with at least THREE (3) credits in any subject; or
ii. Pass SPM/SPMV or its equivalent with at least THREE (3) credits AND pass pra-diploma with minimum SIX (6) months duration; or
iii. Pass UEC with at least Grade B in THREE (3) subjects; or
iv. Pass O-level with at least Grade C in THREE (3) subjects; or
v. Pass SKM level 3 in related disciplines; and
    a. pass SPM with at least ONE (1) credit in any subject; and
    b. ONE (1) semester of a bridging programme (if required); or
vi. Pass certificate of Kolej Komuniti or equivalent to level 3 MQF in related disciplines; and
    a. Pass SPM with at least ONE (1) credit in any subject; and

b. ONE (1) semester of a bridging programme (if required); or

vii. Pass certificate (level 3 MQF) in related disciplines with at least CGPA 2.00 and ONE (1) semester bridging programme (if required); or
viii. Pass SVM in related disciplines with at least CGPA 2.00; or
ix. Pass STPM or its equivalent; or
x. Pass STAM (Grade Maqbul) or its equivalent; or
xi. Pass a recognised TVET-related skills certificate with ONE (1) year of relevant work experience; or
xii. Other recognised qualifications or its equivalent.

Advanced Diploma in Technology or equivalent (Level 5 MQF)

i. Pass Diploma in related disciplines with at least CGPA 2.00 or its equivalent.

Bachelor of Technology or equivalent (Level 6 MQF)

i. Pass STPM or its equivalent with at least Grade C (NGMP 2.00) in TWO (2) subjects; or
ii. Pass Matriculation / Foundation in any IPTA / IPTS / permitted institutions to conduct foundation programmes with CGPA 2.00; or
iii. Pass Diploma in related disciplines with CGPA 2.00; or
iv. Pass Advanced Diploma in related disciplines with CGPA 2.00; or
v. Pass UEC with at least Grade B in FIVE (5) subjects; or
vi. Pass STAM (Grade Jayyid) or its equivalent; or
vii. Other recognised qualifications or its equivalent.

9.3.2 Articulation Regulations, Credit Transfer and Credit Exemption

The programme shall have well-defined policies, regulations and processes of articulation practices, credit transfers and course exemptions. EPs shall well communicate the policies, regulations and processes to the public.

9.3.2.1 Student transfer

The EPs shall have well-defined policies and mechanisms to facilitate students' mobility which may include student transfer within and between institutions. The related policies and mechanisms shall be well communicated to the students and public. Department must ensure that the incoming transfer students have the capacity to successfully follow the programme structure.

9.3.2.2 Credit Transfer

Recommended credit transfer practice is as below:

i. Credit transfer can be implemented in two categories as follows:

   a. Vertical – credit transfer from a lower to a higher qualification level.
   b. Horizontal – credit transfer from the same qualification level such as from certificate to certificate / diploma to diploma / bachelor degree to bachelor degree.

ii. Credit transfer must be based on course mapping (subject to subject mapping) as follows:

   a. Passing grade – minimum Grade C;
   b. Credit value – equivalent to credit value for the recipient EP or if it is from overseas, then it must be equivalent to the credit currency (e.g. In Malaysia 1 credit is equivalent to 40 hours SLT whereas in UK 1 CATS is equivalent to 10 hours SLT; 3 credits in Malaysia is equivalent to 12 CATS in UK).
   c. Course curriculum similarity – at least 80% course content or 80% of equivalent cognitive based course outcomes; and
   d. Credit transfer courses must be of accredited or recognised programmes from the authorized bodies in the respective country.

iii. Vertical Credit transfer policy is based on the following situation:

   a. Maximum of 30% credit transfer from certificate to diploma level is allowed.
   b. Maximum of 30% credit transfer from diploma to bachelor degree is allowed. If the programme curricula has been designed (home-grown or through formal collaboration partners) to ensure continuity, coherence and completeness from diploma to bachelor degree, the maximum credit transfer allowed is 50% OR subjected to latest credit transfer policy set by Quality Assurance Policy Review MOE-MQA.
   c. Maximum of 50% credit transfer from advanced diploma qualification (also has diploma qualification) or equivalent to bachelor degree is allowed.
   d. Credit transfer from a higher (e.g. bachelor) to a lower qualification level (e.g. diploma) is not allowed.

iv. Horizontal credit transfer policy is based on the following situation:

   - Credit transfer is not allowed for a student who has a qualification (e.g. Diploma in Computer Technology) and wish to pursue the

same programme (e.g. Diploma in Computer Technology) in the same or different EP.

- Credit transfer is allowed for a student who wants to change to another programme in the same field. If the change is within the same EP, there is no credit transfer limit, but it is subjected to the established credit transfer requirement. On the other hand, if the change is at a different EP, the percentage of the credit transfer is subjected to the student's residential requirement (residential year)*
- Credit transfer (including compulsory courses) is not allowed for a student who has failed in the programme of study and plans to pursue the study in other programme at the same level of academic qualification.
- Credit transfer is allowed to any students who discontinue the programme of study and plan to resume the study but in other programme at the same qualification level.
- Credit transfer is not allowed for students who failed their study and want to resume the study but in other programme at the same qualification level.

If the programme is taken in the same EP, no credit transfer limit is subjected to credit transfer requirement.

If the programme is taken in different EP, credit transfer is subjected to students' residential year requirement.*

As a guide, typically the currency of knowledge for a programme is approximately 5 years.

* Residential year an institution that confers academic qualifications are as follows:

- Bachelor Degree : 1 year
- Diploma and Certificate : 1 semester (Long Semester – between 5 and 6 months)

9.3.2.3 Course Exemption

i. If the exemption of the courses will result in inadequate credit fulfilment , students will have to take additional courses with credits to replace the exempted courses, subject to the courses to be of the same programme level.

9.3.3 Student Support Services and Extra-Curricular Activities

Suitable and sufficient support services for physical, social, financial, recreational, counselling and health should be provided by EPs to the students. Appropriate arrangement should be made in order to stimulate and increase students' participation in extra-curricular activities organized by clubs and societies.

The EP shall make available with easy access the personal or psychological counselling of career planning and employment advisory services for students. Student Support Services should be supported with adequate and qualified administrative personnel. The provided support services should be supervised and benchmarked against other similar institutions, where essential strategies should be established to boost the quality of services.

9.3.3.1 Student Representative

The EP shall have well-defined regulations and processes for students to establish the representative organisation especially in those areas that affect their interest and welfare.

Established students' representation organisation shall function well to provide basic managerial and leadership experiences as well as character building among the students.

Each EP is encouraged to establish the Student Technologist Chapter among the students to motivate them progressing towards the goal of being technologists.

9.3.3.2 Alumni

EPs shall have active linkages with alumni to support the development of the programme, to review and to continually improve the programme. The programme shall have access to an updated registry of alumni which contains information related to their latest employment, continuing study and professional activities. In term of students' linkage with alumni, opportunities should be provided via suitable facilities and organizational arrangements.

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9.4 Criteria 4: Teaching and Support Staff

EPs shall show that the teaching, technical and administrative staff are adequate both from the quantity and quality perspectives. The objective should be to provide excellent professional teaching and learning experiences to facilitate the students' development according to the standards of MBOT.

9.4.1 Teaching Staff

9.4.1.1 Qualification

EPs should have a recruitment policy, criteria and other related processes for teaching staff. The recruitment process has to ensure that the fields of expertise of the teaching staff are relevant to the programme being offered. The academic qualification of the teaching staff has to be from the accredited programmes and/ or reputable institutions.

For Bachelor's degree programmes, the level of academic qualification for the teaching staff has to be at least a Master's degree OR a Bachelor's degree with a minimum of 3 years of industrial experience and related skills relevant to the programme. However, this category of staff should consist of 30% and less out of the total academic staff.

For Diploma programmes, the level of academic qualification for the teaching staff has to be at least a Bachelor's degree OR a Diploma with a minimum of 3 years of industrial experience with relevant skills related to the respective programme. However, this category of staff should consist of 30% and less out of the total academic staff.

EPs must ensure all academic staff have appropriate competency levels for teaching practical–oriented course within the programme.

If the teaching staff do not meet the required level of expertise for instance if they are from a different field or their competency is lower than the requirement, EPs should prepare them with upskilling/ reskilling programmes with professional certificates or competency training from dedicated reputable institutions. Additionally, such teaching staff should be mentored by a suitable personnel at the industry to increase their skills. In this regard, a systematic buddy system should be established by the EPs. However, this category of staff should consist of 5% and less out of the total academic staff.

For the industrial based learning or programme conducted through the Industrial Mode/Apprenticeship, EPs must have a proper mutual agreement with the respective industry. There should be a suitable industry mentor appointed to assist the students with experiential learning at the industry. The industry mentor should be trained by EPs to ensure learning takes place as well as to validate assessments for the outcome attainment.

9.4.1.2 Industrial Experience and Professional Qualification

In line with the emphasis on industry relevant teaching and learning, at least 5% of the teaching staff must have a minimum of 1 year industrial experience in related fields. If this requirement is not met, then the EPs must have an industrial attachment scheme in place. The scheme should demonstrate a proper plan for the staff industrial attachment in which they have to accumulate a year of industry experience for continuous teaching and learning industry relevant, specialisation needs.

EP should ensure all qualified teaching staff to register as GT or QT, and they must have a proper registration with the Board. If this is not met, EPs must ensure the academic staff have a proper competency training relevant to the programme.

At least ONE (1) teaching staff of the programme must be a Ts. or Tc. registered under MBOT. If this is not met, EPs must show effort towards complying with this criteria.

9.4.1.3 Research, Publication, Product Development and Consultation

For EPs offering bachelor degree programmes, a clear policy on research, publication, product development and consultation should be in place.

For EPs offering diploma or certificate programmes, a clear policy to encourage research, publication, product development and consultation should be established.

9.4.1.4 Staff Student Ratio

Staff to student ratio is an important component in the effort to produce competent graduates. To start a programme, the programme shall has a minimum of full time staff in the relevant field as follow:

i. For Bachelor's degree programmes, staff to student ratio should be at least 1:15 with a minimum of 6 full time teaching staff in the field of

programme. (Note: 80 credits technology course. For technology, 1 full time teaching staff is equivalent to 15 credits. Minimum full time staff = 80 / 15 = 5.3 ≈ 6 staff).

ii. For Advanced Diploma programmes, staff to student ratio should be at least 1:20 with a minimum of 2 full time teaching staff in the field of programme. (Note: 20 credits technology course. For technology, 1 full time teaching staff is equivalent to 15 credits. Minimum full time staff = 20 / 15 = 1.25 ≈ 2 staff).

iii. For Diploma programmes, staff to student ratio should be at least 1:20 with a minimum of 4 full time teaching staff in the field of programme. (Note: 60 credits technology course. For technology, 1 full time teaching staff is equivalent to 15 credits. Minimum full time staff = 60 / 15 = 4 staff).

iv. For Certificate programmes, staff to student ratio should be at least 1:20 with a minimum of 2 full time teaching staff in the field of programme. (Note: 30 credits technology course. For technology, 1 full time teaching staff is equivalent to 15 credits. Minimum full time staff = 30 / 15 = 2 staff).

For full time and part time staff ratio, at least 60% of the teaching staff is full-time.

9.4.2 Technical Support Staff

Technical support staff is classified as the staff who are not directly involved in teaching students. Rather, they assist the teaching staff during the teaching and learning activities to ensure effective delivery.

9.4.2.1 Qualification

EPs shall have a recruitment policy and criteria for the technical support staff. The qualification of the support staff should be relevant to the intended job specifications. All qualified technical support staff in the programme must be registered as QT under MBOT. If this is not met, EPs must plan for the technical support staff to attend and complete a proper competency training relevant to the job scopes.

9.4.2.2 Facility Staffing

Each teaching facility has to be adequately staffed to enable its intended function and compliance to safety requirement.

9.4.3 Administrative Support Staffs

Apart from the teaching and technical support staff, EPs must also allocate a sufficient number of administrative support staff for the programme to run smoothly.

9.4.3.1 Qualification

EPs must have a recruitment policy and criteria for administrative support staff. The qualification of the support staff should be relevant to the intended job specifications.

9.4.4 Staff Development and Training

EPs shall have a mechanism for continuous staff development. In addition, EPs shall have a mechanism for the career development of the technical support staff.

9.4.5 Staff Industry Engagement

Industry engagement is an important exercise to ensure that teaching staff stay relevant with the industry developments. EPs must provide a clear guideline in encouraging industry engagement among both teaching and technical support staff.

EPs shall have a continuous industry engagement to ensure teaching and learning activities are industry-relevant.

9.4.6 Staff Evaluation

EPs must have in place an assessment system for the annual evaluation of all staff. EPs should also have a system for the evaluation of teaching staff by the students.

9.4.7 Educators Certification

All teaching and support staff who are directly involved in teaching and learning must undergo a structured teaching and learning training prior to engaging in teaching and learning activities. If this is not met, EPs must show a proper planning and execution to ensure this has taken place.

It is highly encouraged for the teaching and support staff to obtain teaching and learning training and/or certification from MBOT or other respective body recognised by MBOT. Otherwise, structured internal teaching and learning training is required to be conducted.

9.5 Criteria 5: Educational Resources

Educational resources are physical, research and development facilities, as well as financial resources to support the delivery of a programme. The programme shall have enough and appropriate educational resources to ensure its effective delivery.

It is important that students utilize and benefit from the educational resources made available. It is also compulsory that the safety, environmental, sustainability, cultural, professional, ethical and legal factors are taken into consideration in the planning and operation of the educational resources.

9.5.1 Physical Educational Facilities

Physical facilities are the structure in which learning activities take place. This includes, but not limited to, classrooms, workshops, laboratories, libraries, internet connections, software, and relevant equipment. The programme should ensure the quality, availability, relevancy and utilization of the facilities.

Adequate and suitable experimental and practical facilities should be accessible since technology programmes acquire substantial practice-oriented learning. This is to ensure that the students receive vital experience in practice-oriented learning and in the understanding of and operating the technology/technical apparatus/equipment as well as in designing and performing experiments. The equipment should rationally illustrate the modern technology practices preferably of High Technology (HT) and High Value (HV).

The programmes shall have adequate physical facilities including:

1. Lecture Rooms (with good audio-visual resource);
2. Labs / workshops / studios (where essential and in line with the requirements of the programme);
3. Modelling Lab;
4. Tutorial / Discussion Rooms;
5. Activity Rooms;
6. Library Facilities (containing online resources);
7. Internet Access;
8. Adequate access to appropriate software and hardware corresponding to the needs of the programme;
9. General / Specialised components / equipment similar to the industrial usage (1 set of apparatus should be provided to each practical session for a group of not more than 4 students); and

10. Experimental laboratory for practical work should specialize the technical fields within the programme.

In order to assist the students' life on campus and to establish the development of self-character, reinforced facilities such as hostels, cafeteria, CCTV, sport and recreational centres, health centres, student centres, and transportation should be satisfactory.

9.5.2 Research and Development

For EPs offering bachelor degree programmes, research and development facilities must be in the structure in which research and development take place. This includes having access to the latest technical publications, dedicated laboratories to run controlled experiments and workshops for development of activities.

The programme should ensure that research and development are part of the learning ecosystem. The programmes shall have adequate research laboratory and equipment relevant to the learning activities.

For EPs offering advanced diploma programmes and lower, research and development facilities are encouraged and could be geared towards cultivating the research and innovation culture.

9.5.3 Financial Resources

Financial resources includes all financial funds of the organization to conduct the programme. There should be some allocations for the operation and maintenance of the programme. The programme shall demonstrate financial viability and sustainability for the programme.

The department must have a certain degree of responsibility and authority in budgeting and distributing resource for smooth progress of the programme. The department should also possess systematic procedures to manage financial resources which are sufficient and effectively sustained. EPs must demonstrate financial viability and sustainability for the programme.

9.6 Criteria 6 : Programme Management

Programme management is the control of resources of the programme including staff, financial and facilities for the purpose of achieving its objectives. Programme management requires good governance, inspiring leadership and detailed record management while adopting a work culture that is professional, ethical, seeks continuous improvement and emphasizes safety, environmental and sustainable factors.

9.6.1 Programme Governance

Governance is the structure, policy and procedures that governs a programme. The programme shall have a formal governance structure in which a programme is supported by the staff or committee performing various function.

A collection of policies, principles, rules, and guidelines are designed or adapted by the programme to achieve its long-term objectives. The policies must be advertised and be readily accessible. Procedures are defined as the specialized approaches engaged to articulate policies in action in day-to-day operations of the programme. In order to regulate all major decisions and actions, the department shall possess formalized policies and procedures.

9.6.2 Programme Leadership

Leadership at departmental level is required to provide guidelines and directions as well as to manage finances and other resources. The leadership is also vital to ensure the programme stays aligned to its mission, identity and the requirement of stakeholders. Programme leadership acquires a person who may conduct all the essential curriculum supervision and analyses towards a new establishment in the field. The department shall have a dedicated leader in related field. The criteria for selection of a programme leader is as follows:

Certificate and Diploma
Bachelor's Degree in related field with THREE (3) years of relevant academic experience, preferably with a PT (Ts.) or Diploma in related field with FIVE (5) years of relevant academic experience, preferably with a CT (Tc.).

Bachelor's Degree
Master's Degree in related field with THREE (3) years of relevant academic experience, preferably with a PT (Ts.) or Bachelor's Degree in related field

with FIVE (5) years of relevant academic experience, preferably with a PT (Ts.).

9.6.3 Record Management

Record management denotes a set of activities for efficient monitoring of the creation, distribution, usage, maintenance, and disposition of recorded information declared as a documentation of the programme activities and transactions. The department shall maintain the students' records related to their admission, performance, completion and graduation and preserve these records for future references.

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9.7 Criteria 7: Quality Management System

EPs shall have systematic and coordinated activities in place to achieve its educational objectives. Elements of quality management system includes governance and institutional supports, stakeholders' involvement, curriculum review, as well as facilities planning and management.

9.7.1 Quality Assurance

Governance and institutional support shall be sufficient to protect and improve the programme quality to satisfy the needs of stakeholders.

9.7.1.1 Governance Support

Governance which reflects leadership of the EP shall emphasise excellence and scholarship.

Leadership at a departmental level should portray clear-cut procedures and directions, develop relationships among distinguished stakeholders in relation to collegiality and clarity, manage finances and other resources with responsibility, simulate partnership with significant stakeholders in educational delivery, research and also consultancy.

EPs should also abide by the policies and practice good governance in accordance to the institutional acts.

Adequate autonomy shall be granted to the department to carry out its responsibility effectively.

9.7.1.2 Institutional Support and Resources

Adequate resources including institutional services, financial support, and staff (both administrative and technical) shall be provided to meet the needs of the programme.

These resources must be adequate to draw attention to, maintain, award and administer the continued professional establishment of the staff.

Available resources should be adequate to acquire, maintain, and operate infrastructures, facilities, and equipment suitable for the programme, and to create an environment where students' outcomes can be accomplished.

9.7.2 Stakeholder's Engagement for Programme Review

Feedback from stakeholders including students, alumni, employers, professional bodies, teaching staff, and informed citizens shall be obtained to continually improve the quality of a programme.

In order to institutionalise the feedback mechanism, EPs should establish at least the following committees;

i. Programme advisory committee
ii. Student representatives
iii. Examination body

9.7.2.1 Programme advisory committee

A Programme advisory committee shall comprise of professionals, industry representatives, external academic evaluators, subject-matter experts, alumni and other relevant stakeholders.

9.7.2.2 Student Representatives

Currently enrolled students shall provide feedback on the quality of programmes and any other issues at least once in a semester.

9.7.3 Monitoring, Review and Evaluation

Programmes shall continually be monitored, reviewed and evaluated. Aspects of programme to be monitored, reviewed and evaluated includes the EP's governance, institutional processes, curriculum components (outcomes, content, delivery and assessment), as well as students and graduates achievement.

The department shall monitor, review and evaluate curriculum structure and processes, students' performance and graduates' employability. Mechanisms shall be in place to monitor and evaluate the graduates learning outcomes.

9.7.3.1 Examination Committee

The Examination Committee shall monitor, evaluate and review performance of students in each programme.
The committee shall meet at the end of every semester to review the students' achievement and performance.

9.7.4 Benchmarking

Benchmarking process on the quality management system should be employed by EPs in order to ensure that the programme offered is of comparable quality to that of good standing education institutions.

9.7.5 Continual Quality Improvement

The programme shall regularly and systematically be assessed and evaluated for continual improvement.

EPs shall provide evidence on the efforts in keeping abreast with latest technological changes and stakeholders' needs. These must be presented by, but not restricted to:

i. A comprehensive curriculum and core courses review at least once every programme cycle;
ii. Quality evaluation by external advisor at least once in every 2 years;
iii. Quality evaluation by industry advisor at least once in every 2 years;
iv. Progressive evaluation of practical and industrial attachment practices and records;
v. Preventive maintenance/maintenance/calibration of equipment at regular intervals;
vi. Linkages and involvement with industry;
vii. Dialogue sessions with stakeholders at least once every programme cycle;
viii. Presentations by either local or international keynote speakers possessing relevant expertise ;
ix. Active academic staff participations in relevant conferences/seminars/workshops/short courses;
x. Organisation of conferences/seminars/workshops.

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10.0 Accreditation

10.1 Introduction

Programme accreditation is carried out through three stages of evaluation, namely Provisional Accreditation, Full Accreditation and Re-Accreditation. Each stage has a different quality focus depending on the state of development, delivery and progression of the programme.

Provisional Accreditation emphasises on the design of curriculum and the preparatory arrangements for the programme delivery. Full Accreditation verifies the delivery of the programme and the availability of the support systems, while New Cycle Accreditation examines the programme sustainability based on the quality maintenance and enhancement.

10.2 Accreditation Process

There are differences between the three stages of accreditation although they possess many common processes. The differences are illustrated in the following description of the process and timeline.

Once the EP submits the corresponding documents for evaluation purposes, TTAC then analyses the documents to ensure that it is complete. TTAC then assigns an Accreditation Panel (AP) and performs the evaluation exercise corresponding to the designated timeline and process.

10.2.1 Provisional Accreditation

When the application is thought-out as complete for Provisional Accreditation of a programme from the EP, TTAC will then conduct the assessment procedures. Once the completion of the assessment process is considered successful, TTAC will then award the Provisional Accreditation to the programme. The flow chart of the Provisional Accreditation process is illustrated in Appendix C.

A conventional timeline for a Provisional Accreditation process is illustrated in Table 6.0.

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Table 6.0 Typical Timeline and Process for Provisional Accreditation

Week	Activities and Responsibilities
1	• EP hands over a complete application to TTAC • TTAC: - files the application - determines the specific programme out of the 23 MBOT field technology and technical programmes - forwards the application to the corresponding officer - determines if the information handed over is complete and informs the EP that the assessment procedure will take place
2	• TTAC: - assigns members of accreditation panel (AP) - submits the application to the AP
3–6	• AP then assembles the evaluation report (a coordination meeting is arranged between TTAC, EP and the AP if necessary) • AP submits the evaluation report to TTAC
7–8	(A site visit is conducted at this point if it is acquired) (Coordination meeting between EP, TTAC and the AP, is conducted if necessary) • Chairman of the AP: - panel members then sorts out the collection of the reports - hands over the assessment report to TTAC - TTAC verifies the assessment report and hands it over to the EP
9–10	• EP then provides feedback regarding the evaluation report to TTAC
11–14	• TTAC submits the feedback to the Panel Chairman • Chairman then assesses the feedback provided. • TTAC Vetting Committee will then inspect the report before it is ready for submission to the Accreditation Committee • TTAC prepares the report and make suggestions to the Accreditation Committee Meeting
15	• TTAC: - notifies the EP of the decision of the Accreditation Committee to grant or deny Provisional Accreditation

10.2.2 Full Accreditation and Re -Accreditation

When the first cohort of students reaching their final year, an application for Full Accreditation is conducted. Full Accreditation requires a site visit by the AP. The Full Accreditation procedure can be categorized into three fundamental categories which includes before, during and after the site evaluation visit. A flow chart for Full Accreditation process is provided in Appendix C.

Re-Accreditation is divided into two stages, namely New Cycle Accreditation and Continuing Accreditation. New Cycle Accreditation applies a process similar to Full Accreditation. Its evaluation focuses on the relevancy and sustainability of the accredited programmes. Continuing Accreditation process is when EP do not complete 5 or 6 years full accreditation, in which they need to apply for Continuing Accreditation based on conditions provided below. The flow chart for Continuing Accreditation process is illustrated in Appendix D.

i. Rubric for accreditation forwarding to complete 5 Years / 6 Years of full Accreditation after obtaining a full Accreditation of the new cycle applies to a programme that has been accredited.
ii. EP must apply for accreditation forwarding to obtain full Accreditation 6 months before expiry of accreditation period or with the approval of TTAC.
iii. EP has to submit the compliance feedback to the terms and recommendations of the previous accreditation improvement.
iv. MBOT will appoint one of the panels (The Chairman of the previous accreditation assessment is prioritized) to conduct the compliance assessment and improvement.
v. The appointed panel will produce a pre - visit report and recommend to the TTAC of the MBOT assessment audit requirements either desktop audit or audit visit.
vi. MBOT has the right to determine the accreditation forwarding evaluation method and the appointed panel will need to prepare a report of the proposal for the extension or rejection of accreditation to TTAC MBOT.
vii. Any delays need to be approved by TTAC.
viii. Accreditation forwarding application can only be applied once.

10.2.2.1 Before the Evaluation Visit

Table 7.0 describes the preparatory stage before the evaluation visit.

Table 7.0 Typical Timeline prior to Evaluation Visit

Week Before	Activities and Responsibilities
8-7	• EP submits a complete Full Accreditation/ Re-Accreditation application to TTAC • TTAC: - records the application - determines the specific programme out of the 23 MBOT field technology and technical programmes - forwards the application to the corresponding officer - determines if the informationhanded over is complete - informs the EP that the evaluation process will be conducted **Note**: TTAC will notify EP to submit the application for Re-Accreditation.
6	• TTAC: - assigns the members of the AP - sends out the application to the AP
5-1	- APs prepares the initial evaluation report - TTAC, EP and the APs decide on a date for evaluation visit to the EP - APs holds a preparatory meeting - APs sends the preliminary evaluation report to TTAC

The Panel of Assessors Preparatory Meeting

A Preparatory Meeting with the AP is administered preferably two weeks before the visit upon accepting the initial report from each panel members. In this meeting, the AP will:

i. share each other's point of views regarding the EP's documents;
ii. signify the fundamental issues for evaluation purpose;
iii. analyse the assessments' processes;
iv. seeks for any additional information, clarification or documentation required from the EP; and
v. analyse the itinerary for the programme's evaluation visit.

Following the Preparatory Meeting, if necessary, TTAC will seek for any additional information, clarifications or request for specific documentations from the EP.

10.2.2.2 During the Evaluation Visit

The primary objective of the site evaluation visit by the AP is to verify the statements, descriptions and conclusions to be suggested for improving the activities as presented in the PSRR as well as to obtain additional insight of the programme's operations via first-hand investigation and personal interaction. A visit verifies a qualitative evaluation of those factors that are not smoothly documented in a written form and this may include facilities inspection.

Visits can be conducted from two to three days subject to the scope of the visit. Table 8.0 demonstrates a typical 2-day visit schedule.

Table 8.0 Typical Schedule for an Evaluation Visit

Visit Day 1 date to be determined)			
Time	**Activity**	**Location**	**Persons involved**
0800	The institution picks up the panels from Hotel	Officers Administration will inform the location/ venue.	-
0830 – 0900	Briefing to the panel / discussion session / examine the materials given for reference (such as the project reports and examination resources)	EPs will inform the location.	Panel members only
0900 – 1000	The host organizes a welcoming ceremony. The Institution is usually represented by a Senior University representative, for example the VC or DVC.	EPs will inform the location.	Panel members, host and liaison staff
1000 - 1015	Morning Break	EPs will inform	University will

		the location.	insert the attendees
1015 - 1100	Meeting with the Course Coordinators	EPs will inform the location.	University will insert the attendees
1100 - 1230	Meeting with the teaching staff together with the casual teaching staff	EPs will inform the location.	University will insert the attendees
1230 - 1300	Meeting with the students' representative	EPs will inform the location.	University will insert the attendees
1300 - 1400	Break	EPs will inform the location.	-
1400 - 1530	Meeting with the students and graduates	EPs will inform the location.	University will insert the attendees
1530 -1700	Campus Tour (Labs, Computer Lab, Library, teaching / learning / work spaces as relevant	EPs will inform the location.	University will insert the attendees
1700	End of first day visit		
Visit Day 2 (date to be determined)			
Time	**Activity**	**Location**	**Persons involved**
0800	The institution picks up panels from Hotel	Officers Administration will insert the location	-
0830 – 0900	AP Meeting	Officers Administration will insert the location	Panel members only
0900 – 1100	Document Review	EPs will inform the location.	University will insert the attendees
1100 - 1300	Meeting with Programme Team, Counsellors and Other Support Staff	EPs will inform the location.	Attendees to be inserted by University

	(If necessary)		
1300 - 1400	Break	EPs will inform the location.	-
1400 - 1530	AP finalises findings	EPs will inform the location.	Panel members only
1530 - 1630	Exit Meeting at programme level	EPs will inform the location.	Panel members and programme owner (two way conversation)
1630 - 1700	Exit Meeting at EP level	EPs will inform the location.	Panel members, host and liaison staff (one way conversation)
1700	End of Visit Accreditation	Officers Administration will insert the location	-
The itinerary arranged complies with the specific audit priorities, issues and availability of evidences as agreed by TTAC, AP and EP.			

EP provides background information on the institution and programme during the opening meeting.
In order to resolve issues regarding the efficiency of the programme in accomplishing its objectives, the panel perform interviews with staff, students and other corresponding stakeholders.

The main objective of the site visit is to obtain in-depth information with regards to the administrative and educational aspects of the programme to be audited. The first stage of the visit is the opening meeting in which the top management of the EP, the faculty/ department offering the programme as well as those of relevant departments will be present. They will provide background information on the institution, details on the respective faculty and the programme to be audited. It should be noted that prior to having the opening meeting, all panels will have a brief discussion to establish a common understanding of the programme and to agree on the activities throughout the visit.

After the opening meeting, interviews will be conducted with various parties to clarify any issues related the programme. They include the academic staff, the support service staff, current students, alumni and student representatives. All related supportive documents provided by the EP will also be scrutinised. These include, but not limited to, records of minutes of meetings, external evaluators' reports, assessments processes and procedures, and examinations papers. Evaluations of facilities like classrooms, labs, library, strong room, etc. are also conducted during the site visit.

The Oral Exit Report at Programme Level

During the exit meeting at programme level, the chairperson provides feedback to the programme owner orally. The feedback comprises the findings of key information such as the programme's areas of strengths, the areas of concern and any opportunities for improvement. Also, the members of the meeting representing the EP are allowed to give clarifications in response to the feedback given by the chairperson during the exit meeting. Further information gathered during the exit meeting will also be considered for inclusion in the Final Evaluation written report by the chairperson.

The Oral Exit Report at Institutional Level

During the exit meeting at institutional level, the chairperson provides brief feedback to the EP orally. The feedback comprises the findings of key information such as the programme's strengths, area of concerns and opportunities for improvement. This exit report normally conducted in one way feedback since the details has been discussed at the programme level and the details of feedbacks will be covered in final report.

10.2.2.3 After the Evaluation Visit

Table 9.0 describes the activities undertaken after the evaluation visit.

Table 9.0 Typical Timeline for Post Evaluation Visit

Weeks After	Activities and Responsibilities
1-2	• An individual report is produced by each assessor. The report will be then sorted by the chairperson of the AP and presented to TTAC.
3-4	• For the verification of facts, TTAC submits the final evaluation report to the EP.

5-6	• EP gives feedback on the final evaluation report to TTAC.
7-10	• The feedback to chairperson/assessor is sent to TTAC. • The feedback is then evaluated by the Chairperson/assessor. • The report is then reviewed by TTAC Vetting Committee which is then ready for submission to the Accreditation Committee. • TTAC finalizes the report and recommends decisions to the Accreditation Committee.
11-12	• TTAC: - The decision of the Accreditation Committee is notified to the EP.

Note: These timelines exclude additional time that may occur as a result of several factors, e.g. visit arrangements, delay in gaining feedback, etc.

The Draft Evaluation Report

The report is prepared by the chairperson in full consultation and cooperation of all the panel members to make sure that it reflects an overall view of the AP. The draft will be sent to the EP for feedback before the report is concluded. The EP then verifies on the credible matters of the draft which is then returned to TTAC within a particular time frame.

The Final Evaluation Report

At the end of the visit, the panels may reach conclusions of the running of the programme as evident from the interview data, the related documents and observations. The panels will provide a report consisting of commendations of the programme, feedback to the areas of concern, and recommendations for improvement.

10.3 Accreditation Application

The EP should apply for programme accreditation as per the requirements of Section 9 of the TTAC Manual. The processes demonstrating Application for Accreditation and Approval of Technology and Technical Programmes are shown in Appendices B-E.

10.4 The Accreditation Panel

For the purpose of either obtaining a Provisional Accreditation, Full Accreditation or Re – Accreditation of programmes, EPs will make submissions to TTAC through MQA. Assessment for Provisional Accreditation,

Full Accreditation and Re - Accreditation depend on the information given in SRR, respectively. These assessments also depend on other documents submitted, which are additionally supported by observation, written and oral evidence, as well as personal interactions during the evaluation visit by assessors assigned by TTAC.

Programmes are fundamentally assessed or evaluated for the accreditation or maintenance of accreditation purpose. In this section, the terms of assessment and evaluation are utilized correspondently.

In general, the respective EP and its relevant departments are expected to have mechanisms in place for verification and also to be able to demonstrate to the APs that the procedures are effectively utilised and that there are plans to refine any shortfalls.

The main task of the APs is to certify that the policies and standards are in agreement, and that the processes, mechanisms and resources are suitable for the efficiency of the programme delivery. Verification involves assessment of the efficiency of the quality assurance procedures. The assessors investigate the executions of these procedures in relation to the accomplishment of the expected programme learning outcomes.

The members of the AP are nominated depending on the type, level and discipline of the programme to be assessed, as well as the availability, suitability, expertise, experience and neutrality of the prospective panel members.

10.4.1.1 Personal and General Attributes of Assessors

Assessors should be proficient, open-minded, possess high level of maturity, good speakers as well as good listeners. They must also have fair intuition skills, analytical skills and they should be diligent and able to perceive situations in a common sense way, acknowledge the complex operations from a broad perspective, and value the roles of individuals in the organization.

The descriptions of assessors as such mean that they will:

i. Gain and evaluate objective evidence equitably;
ii. be honest towards the intention of the assessments' exercise;
iii. evaluate the observations and personal interactions during the visit objectively;
iv. consider the concerns of the institution in such a way that will definitely accomplish the objective of the evaluation;

v. give thorough attention and supports the evaluation procedures without being bias;
vi. react professionally in offensive situations;
vii. reach general objective and conclusions based on the rational considerations; and
viii. remain persistent in the final decision even though the pressure to change the decision is extremely high.

Nevertheless, it may not be necessary for all panel members to possess all the characteristics and experiences required on an assessor, but as a group, the panels must possess the qualities which should be inclusive of some or all of the following attributes outlined below:

i. Higher education qualification or further education and training aspects which includes:

a. Reasonable subject knowledge and teaching experiences
b. Knowledge on the curriculum design and delivery
c. Programme leadership or management experience
d. Knowledge of higher education or further education and training, which include the understanding of responsibilities and requirements related to the programme and organisational structures
e. Experiences in research and scholarly activities

ii. Quality evaluation aspects:

a. Understanding of the context as well as the environment in which the department operates
b. Commitment towards the principles of quality including the quality assurance in higher education
c. Knowledge in quality assurance, methods as well as terminologies
d. Experiences and skills in reviewing and accreditation procedures
e. Capability in describing procedures to outputs as well as outcomes
f. Ability to communicate efficiently
g. Competence in assessing quality assurance processes and techniques, and proposing good practices and methods for improvements
h. Capability to work in a team

iii. Personal aspects:

a. Integrity
b. Diplomacy
c. Timeliness
d. Breadth and depth of perspective
e. Commitment and diligence

10.4.1.2 Responsibilities of the assessors

Assessors are responsible for:

i. Abiding with the assessments' requirements;
ii. Communicating and certifying assessments' requirements;
iii. Carrying out the responsibilities effectively and efficiently;
iv. Recording all observations;
v. Reporting the evaluation outcomes;
vi. Conserving the documents pertaining to the accreditation exercise;
vii. Protecting the confidentiality of the documents;
viii. Handling Confidential? information with caution; and
ix. Assisting and supporting the Chairperson.

Assessors should:

i. stay within the scope of the programme accreditation;
ii. exercise objectivity;
iii. sort and analyse evidences that are related and adequate enough to make conclusions related to the quality system;
iv. stay alert to any indications of evidences that may influence the results and possibly require further assessment; and
v. respond in an ethical manner at all times.

10.4.2 Conflict of Interest

Prospective assessors will have to acknowledge their interest in the institution. If the potential assessor has a direct interest, TTAC can expel him/her from being considered to be an assessor. Additionally, the EP may register its objections to the appointment. If the EP does not agree with the potential assessor, the reasons and justifications for its objection must be provided. Note that, the final decision on the selection of a particular person as an assessor depends on TTAC.

Conflict of interest can be classified as either personal, professional or ideological.

i. Personal conflict consists of animosity or close relationship between the assessor and the Chief Executive Officer or other senior managers of the EP, or being connected to one, or being a graduate of the programme, or having a close relative in the programme, or if an assessor is extremely biased for, or against, the EP due to some previous occasions.
ii. Professional conflict may occur if the assessor used to fail a position applied for at the EP, or is a current applicant or a candidate for a position at the EP, or is a senior advisor, examiner or consultant to the EP, or is recently attached to an EP that is competing with the one being assessed.
iii. Ideological conflict is based on the differences in world views and value systems. An example of this type of conflict would be such that the assessor is lack of sympathy to the style, ethos, type or political inclination of the particular EP.

10.4.3 Members of the Panel of Assessors

Possible members of the AP are elected from the TTAC Register of Assessors. The selection criteria of the assessors depend on the type of the programme, the features of the EP, and the panels who have relevant background and experiences

It is important that the members of the AP work together in a team, and do not make assumptions on the programme being assessed, nor appear to be prejudice of their own specialty and/ or the practices of their respective EP. All communications between the EP and members of the panel must be made through TTAC.

10.4.3.1 The Chairperson

The chairperson is the main person in the accreditation process and must have experiences as an assessor or evaluator. It is the Chair's responsibility to bring an atmosphere in which intellectual, professional discussions may take place, such that opinions or discussions may be liberally and considerately exchanged, and in which integrity and transparency succeed. Generally, the success of the accreditation exercise depends on the chairperson's capability in facilitating the panel to perform their tasks as a team rather than as individuals, as well as to reveal the best in those whom the panel meets.

The chairperson is also responsible to assure that the oral exit report summarises precisely the findings of the visit and is persistent with the reporting framework. The chairperson then demonstrates the oral exit report which outlines the tentative outputs of the team to the corresponding EP. The chairperson also possesses a major role in the construction of the written report and in assuring that the oral exit report is not prepared differently from the final report.

The chairperson is expected to sort out the reports of the panel members and to work closely with them to complete the draft report within a particular time frame. The chairperson is also responsible in arranging the contributions from other team members and to assure that the overall report is evidence-based, standard-referenced, coherent, logical and internally persistent.

10.4.3.2 The Panel Members

Panel members are elected based on the expertise and the experience in enabling the accreditation processes to be conducted efficiently.
In assessing the EP's application for Provisional, Full Accreditation or Re – Accreditation of a programme, the panel members must:

i. evaluate the programme to ensure the compliance with the MQF, recent policies, programme standards and the seven criteria of assessment, as well as against the educational goals of the EP and the programme objectives and findings;
ii. certify and evaluate all information regarding the programme sent by the EP, and the suggested improvement plans;
iii. point out issues related to the Programme Self-Review Report (if applicable) which requires attention that would help in its effort towards continuity of the quality improvement; and
iv. achieve a judgment.

10.4.4 The Roles and Responsibilities of the Panel of Assessors

The related documents sent by the EP to TTAC for the application of Provisional or Full Accreditation, or Re-Accreditation of a programme will be circulated to the members of the AP. The roles and responsibilities of AP in assessing the programme and preparing a final report may be distinguished by application, i.e., Provisional or Full Accreditation, or Re-Accreditation.

10.4.4.1 Provisional Accreditation

AP is responsible to evaluate the proposed programme in terms of the MQF, Code of Practice for Programme Accreditation, programme standards, programme learning outcomes, programme educational objectives and compliance with existing policies.

The assessment focuses on the soundness of the curriculum and the readiness of the EP to offer it. A visit by APs to the EP to examine facilities is needed for professional programmes and where acquired by the programme standards. The evaluation report must summarise the strengths and weaknesses of the suggested programme and propose recommendations and suggestions for its approval or rejection.

10.4.4.2 Full Accreditation or Re-Accreditation

The roles and responsibilities of AP in assessing a programme and preparing a final report may be classified into a few stages which consists of prior to the site visit, preparatory meeting, during the site visit and after the site visit.

i. Prior to the Site Visit

Prior to the site visit, the panels are required to scrutinise the information in the documents submitted by EP, which include the programme information and the programme self-review report (SRR). This is an important step by the panels to start familiarising with the policies, processes and any issues related to the EP with regards to the programme to be accredited.

The panels will examine the information presented in the documents including the quality management systems and the plans of the programme in achieving its objectives. This is to allow the panels to mould their views with objectivity. They will then analyse the SRR to determine the extent of the quality of the self-review.

An assessor's analysis of the Programme Information and the SRR must yield:

a. an understanding in the main characteristics of the EP and department related to the programme evaluation;
b. the description of the matters for investigation which arise from these characteristics or aspects; and the explanation of other

relevant ideas regarding the strengths, concerns, quality system and suggestions for improvements to the programme.

In preparation for the site visit, the panels may require the EP to:

i. provide additional information or clarification given in the SRR,
ii. supply all information required during the site visit particularly if the amount is large,
iii. prepare responses related to aspects that can be of concern, and
iv. determine the relevant persons or groups to be interviewed.

Each assessor is required to prepare an initial evaluation report to be sent to TTAC and to be distributed among panel members at least a week before the site visit. The report basically will address major topics or concerns determined by the assessors. Having the report earlier will allow for the preparatory meeting during the site visit to focus on the issues identified throughout the reading of the initial evaluation report.

ii. During the Site Visit

The first process during the site visit is to hold a Preparatory Meeting among the panel of assessors. Panel members will share their views of the reading, discuss the areas of concerns and outline the extra information required to be supplied by the respective department.

The main purposes of the Preparatory Meeting is to:

a. comprehend the purpose, context and parameters of the programme or department;
b. sort out and certify issues, aspects and concerns;
c. determine the extra information or documentation required;
d. allocate any particular responsibilities of AP during the visit; and
e. revise the audit plan in accordance to the needs of the evaluation

At the Preparatory Meeting, certain issues or aspects may have been raised or could have been resolved ahead. However, if there occur differences in views or issues, it can be resolved at the end of the evaluation visit. Note that, it is crucial that the assessors maintain their professionalism since this may acquire some debate among the assessors. This is to prevent a public presentation of the

unanimity lack as well as to prevent wasting the short time available for interaction with members of the department and the EP.

In group discussions, panel members must work with and through the Chair without being extra formal. Members must be respectful towards the agenda agreed by the panel for various meetings, and stand by the chairperson as he counterpart the pace of the meeting according to the size of its agenda.

During the interviews with members of the department, the panel must certify aspects and find explanations, justifications and more information. It is crucial to demonstrate an atmosphere for genuine dialogue. All questioning must be accurate, fair and persistent. Specifically, panel members should:

a. investigate discrepancies between written and verbal outputs;
b. look for interpretation and validation when necessary;
c. listen as well as ask;
d. focus more on major compare to minor issues;
e. take part in a collaborative behaviour;
f. be mindful that the dynamics of the panel and its relation to the staff of the department changes accordingly and developed during the visit; and
g. put interviewees at ease to assure their thorough and active contributions.

Panel members can also offer occasional recommendations where necessary, without shifting into the role of a consultant. The panel must try their best to unearth and consider all information related to the audit. The panel utilises various questioning styles to collect the information it acquires, ranging from discursive to directive.

To attend a specific issue, the panel should start by collecting information via open-ended questions, and then examines the issue further by penetrating via other questions depending on the answers to the first question. This will lead to the usage of closed questions, and finally to affirm the impression obtained.

The panel takes into consideration of both quantitative and qualitative data, seeks for particular strengths or areas for improvement and points out examples of good practices. The work of the panel depends on well-chosen samples obtained within the scope of the evaluation or assessment. The samples selected occurs at two levels. The first appears from the assessors' analyses

of the programme information and PSRR. At this level, specific areas can be determined as crucial or problematic and therefore is selected for further investigation. This process is sometimes known as scoping.

On the other hand, at the second level, the panel then make decisions on what documentary or oral evidence is necessary to be sampled within these areas. Some sampling may be conducted to verify information which has already been demonstrated in the PSRR. If this clarifies the information, the panel can then use the remaining of the report with confidence in its correctness and completeness, and prevent the repetition of collection of information that is already available in the EP's written documents.

Even though a panel may not cover all issues thoroughly, it still merges into some issues via a process denoted as tracking or trailing. This form of sampling concentrates on specific issues and attends it thoroughly via few layers of the organisation. For example, to determine that procedures are being applied, a selection of reports related to a specific programme may be desired, and the way an issue is addressed in them would be traced. Apart from that, another instances would be the determination of a system-wide issue, for example the way in which students' assessments of teaching are managed. A department should be notified in advance of the areas in which this method is to be utilised so that sufficient documentation and personnel are readily available to the panel. Note that, some materials are acquired to be supplied in advance of the visit.

Triangulation is a method of investigation of an issue by considering information from sources of distinguished types such as examining the approaches held about it by different individuals in the organisation. For example, certain policies and their application can be reviewed with the senior management, with other staff and with students to determine if the various opinions on, and experiences of, the policy and its workings are persistent.

Aspects of a programme can be determined via committee minutes, courses and teaching assessments, programme reviews, reports of external accreditation, external examiners and external advisors. The panel must figure out where inconsistencies are crucial and are detracting from the accomplishment of the programme's objectives. The panel can also make effort in detecting the reasons for such inconsistencies. If an interviewee

makes a particular criticism, the panel must certify if this is a general experience.

Panel members must then plan and concentrates their questions and must avoid:

a. inquiring multiple questions;
b. using too much preamble to questions;
c. utilising anecdotes or making speeches;
d. outlining the situation in their own organisation; and
e. giving advice (recommendations for improvement and examples of good practice elsewhere may be included in the Evaluation Report).

The questioning and discussion should always be unbiased and polite. It should, however, be accurate and concise, as the Evaluation Report should demonstrate the panel's view of the programme with respect to both strengths and weaknesses, and not only outline a well-constructed facade.

The panel should also gather convincing evidence during the evaluation visit. The evidence-gathering process must be thorough, accurate and precise.

The panel must achieve a clear and well-founded conclusions within the terms of reference of the programme accreditation.

Note: To assist AP during the evaluation visit, TTAC officer usually accompanies AP throughout the visit.

iii. After the Evaluation Visit

Panel members must then make contribution, read and comment on the drafts of the Evaluation Report prepared by the chairperson as soon as after the evaluation visit. Panel members must be satisfied with the Evaluation Report in terms of its accuracy and balance. It is also advisable for the AP to complete the Evaluation Report at the end of the evaluation visit. TTAC will then perform an assessment of efficiency of the AP upon the submission of the Evaluation Report. The Report will be then sent to the TTAC Accreditation Committee.

10.4.5 The Accreditation Report

The Accreditation Report states the outcomes, commendations and areas of concern of the AP. The panel reaches its conclusions via its interpretation on the specific evidence that has been collected where the seriousness of the areas of concern is determined by the evidence.

The Accreditation Report should not consists of ambiguous or debateable statements. Firm views are categorically stated, avoiding extravagant delicacy. The Report should not make any comments on individuals nor appeal to unimportant standards.

The outcomes obtained from the panel contains the identification of commendable practices observed in the EP and the department, and the Report concentrates on these. The Report discusses all the related areas without extra details or trying to list all possible strengths. In writing the conclusions and areas of concern, the following factors are addressed:

i. It must be short, brief and precisely on the point.
ii. It must address issues, not only provide details of the processes.
iii. It must be prioritised to give direction to the department.
iv. It must consider the department's own plans of improvement, make recommendations for improvement in those elements not attended by the SRR, and make productive comments on plans to improve the programme that will then push the department and the EP towards accomplishing its goals and objectives.

10.5 Role Of The Accreditation Officers

The Director of TTAS is responsible for the whole accreditation process whom then gives the fundamental liaison among the Institution and the TTAC via assigned staff which are capable in managing the accreditation visit process.

For every accreditation visit, the Director appoint Accreditation Officers to help the work of the Panels. The Accreditation Officers provide resources to the Panels, and will usually also participate as a Panels member in contributing to the assessment processes where the qualifications and background of the incumbent are necessary.

The Accreditation Officers are also responsible for preparing the visit report representing the Panels.

Other than that, the Administration Officers are also accountable for all the logistics in regards to the visit.

10.6 Accreditation Decision and Cycle

Accreditation Decision depends on the recommendation of the final assessment report where the AP may suggest on the graduating cohort in one of the following:

Table 10.0 Accreditation Decision and Cycle

No	Provisional	Full	Cycle
i	Grant the Provisional Accreditation with / without conditions	Grant the Accreditation with/without conditions based on MBOT accreditation rubric	Continue Accreditation with/without conditions based on MBOT accreditation rubric
ii	Grant the Provisional Accreditation after conditions are fulfilled	Grant the Accreditation after conditions are fulfilled based on MBOT accreditation rubric	
iii	Denial of Provisional Accreditation (with reasons)	Denial of Accreditation (with reasons) based on MBOT accreditation rubric	Withdrawal of Accreditation (with reasons) based on MBOT accreditation rubric

A Provisional Accreditation decision or outcome depends on the final result following from the TTAC meeting and the decision will be submitted to the MQA, with copies to MBOT.

A Full Accreditation programmes which possess major deficiencies are given approval of less than six years accreditation. The EP may take essential actions to verify the deficiencies, and resubmit the information on corrective actions taken. If it is assessed as sufficient, the balance period of the accreditation will be provided by the TTAC. A desktop audit or future visits will be then performed to verify the findings of the remedial actions, given that it is essential to do so. Failure to address the deficiencies cause cessation of the accreditation at the end of the period. The TTAC is capable in

deferring its decision on accreditation provided that certain conditions are met to provide the EP adequate time to accomplish the requirements that are enforced by the TTAC.

The TTAC's decision will be then hand over to the EP through the MQA, with copies to MBOT. The accreditation will be awarded to corresponding programmes, location and mode.

Accreditation Cycle is given to programmes for a maximum time of six years. The EP will then have to re-apply for a Re-Accreditation in not less than six months before the expiry of the accreditation timeframe. Accreditation Cycle is awarded on a full programme cycle basis which provides the number of years, which follows from the MBOT accreditation rubric provided in Table 11.0.

Table 11.0 Accreditation Period

No	Scale	Details	Usage
1	Accreditation Denied	i. Does not meet the qualifying requirement of the minimum quality standard; and ii. Does not meet quality standard criteria requirements	Full Accreditation Provisional Accreditation
2	Delay	i. Meet all / part of quality standard criteria requirements and require time to complete specific requirements; and ii. **Does not take action or take part** / whole of the Temporary Accreditation Terms (if applicable); and iii. **Does not complete** the specific requirements of the Full Accreditation that has been set; and iv. **Does not complete** the proposed Full Accreditation improvement proposal; and v. **Pending improvement process** through internal governenace and external PPT (if applicable); dan vi. The maximum suspension for accreditation assessment may be	Full Accreditation Provisional Accreditation

		granted up to 6 months from the date of approval; and vii. PPT needs to reapply for accreditation and reimburse the accreditation costs; and viii. The provision of accreditation suspension is not a PPT right but at TTAC discretion.	
3	1 Year	i. Meet the full set of quality standard criteria; and ii. Take the whole action from Temporary Accreditation Terms (if applicable);and iii. Take action on some of the specific requirements of Full Accreditation; and iv. **Does not complete** the proposed Full Accreditation improvement proposal; and v. **Pending** improvement process through internal governance and external PPT (if applicable); and vi. PPT needs to apply for continuation of accreditation by submitting a report in compliance with previous terms and reimbursement of accreditation costs; and vii. MBOT has the right to set the balance of accreditation period based on the compliance with the requirements.	Full Accreditation
4	2 - 4 Years	i. Meet the full set of quality standard criteria; and ii. Take the whole action of the Provision Accreditation Terms (if applicable); and iii. Take action on some of the specific requirements of Full Accreditation; and iv. Take action on some of the proposed Full Accreditation improvement proposals; and	Full Accreditation

		v. Take some parts of actions or fail to complete the process of improvement through internal governance and external PPT (if applicable); and vi. PPT needs to apply for continuation of accreditation by submitting a report in compliance with previous terms and reimbursement of accreditation costs; and vii. MBOT has the right to set the balance of accreditation period based on compliance with the requirements	
5	5 Years	i. Meet the full set of quality standard criteria; and ii. Take the whole action of the Temporary Accreditation Terms (if applicable); and iii. Take action to all specific requirements of Full Accreditation; and iv. Take action on some of the proposed Full Accreditation improvement proposals; and v. Take the whole action or part of the improvement process through internal governance of PPT (if applicable); and vi. Pending improvement process through external governance of PPT (if applicable); and vii. PPT needs to submit a compliance report in advance; and viii. MBOT has the right to set the balance of accreditation period based on compliance with the requirements.	Full Accreditation

6	6 Years	i. Meet the full set of quality standard criteria; and ii. Take the whole action of the Temporary Accreditation Terms (if applicable); and iii. Has taken action on the entire specific requirements of Full Accreditation; and iv. Has taken action on the proposed Full Accreditation improvement proposal; and v. Completion of process through internal and external governance of PPT.	Full Accreditation

Table 12.0 Summarize of Accreditation Period

Accreditation Period	**Criteria Standard**	**Provisional Accreditation Requirement (if applicable)**	**Full Accreditation Requirement**	**Suggestions for improvement**	**Internal Governance (if applicable)**	**External Governance (if applicable)**
Accreditation Denied	X	X	X	X	X	X
Delay	/ O	/ O X	X	X	X	X
1 year	/	/	O	X	X	X
2 – 4 years	/	/	/ O	O	O X	X
5 years	/	/	/	O	/ O	O X
6 years	/	/	/	/	/	/

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10.7 Continuing of Full Accreditation Programme

Continuing Accreditation is only applicable for EP whom did not complete 5 or 6 years full accreditation cycle. EP needs to resubmit for Continuing Accreditation 6 months before the accreditation ends. In the case where an EP fails to maintain the quality of an accredited programme, the accreditation status of the programme may be revoked and EP needs to apply for a new Full Accreditation.

Continuing accreditation will be given a maximum of remaining years of the cycle subjected to the compliance of the previous condition.

The Documentation Required
EPs are required to submit SRR03 for the Continuing, acquires: www.ttasmbot.org.my

Declaration
EP verifies if the information and evidence given are correct and have been endorsed by its management.

The Compliance Status of Full Accreditation Conditions
Feedback with evidence for each of the particular full accreditation conditions imposed by TTAC must be provided by EP. Cancellation of accreditation status may be imposed as a result of failure in complying with these conditions.

EP's management must endorse all evidences and ensure that all evidence sent are reliable. Upon possessing more than one evidence for a specific item, all the evidence must be appended together.
The template for SRR03 is available on the TTAS Portal: www.ttasmbot.org.my

10.8 Appeal Procedures

A request outlining the basic of the disagreement can be handed over to the Society's Chief Executive Officer 2 weeks later when the Society officially informs the Institution regarding the accreditation results provided that an institution disagrees with the result of the accreditation assessment of a programme. The request will then be handed over to the top rank who handles the decision making in the Society, who then assigns a sub-committee to investigate the issue which will, if essential, perform additional evaluation visit.

The final decision will be then performed by the Society's top rank who handles the decision making procedure following from the report of the sub-

committee. Any extra expenses acquired will be borne by the EP. The decision and outcome yielded from the Appeals Committee will be submitted to the EP and MQA within 3 months upon receiving completed documents. The decision made by the Appeals Committee is considered final.

Conditions for appealing procedure are usually restricted to flaws with respect to facts or breaches in the Policy, Criteria and/or Procedures written in the paperwork.

10.9 Revision of Programme

Any changes made to an accredited programmes must be advised to the TTAC by the EP. Also, failure in doing so will cause the TTAC to withdraw the accreditation. If that occurs, re-accreditation of the revised programmes will be necessary to be applied by the EP.

10.10 Conflict of Interest

Membership of the Accreditation, Assessment, as well as the Appeal committees unavoidably create circumstances that might lead to conflicts since education is a competitive industry. Conflict of interest or debate regarding the impartiality on the policies and procedures of the accreditation are mostly repetitious. All members must continuously take note of this condition to reveal any genuine or hidden conflict of interest, to disengage from any circumstances or activities which may cause conflicts, and in general to perform themselves in regards to the Code of Ethics of the society.

In a similar situation, the Institution with regards to the accreditation must inform the Society of any feasible conflicts of interest.

10.11 Confidentiality

Panel members, Society Officers and members of the Accreditation Committee are acquired to acknowledge decisively the confidentiality of the facts gained from the report handed over and via meetings with the staff and students from the educational institutions, and staffs from the industry partners of the institution. Accreditation visit details are classified among the Accreditation Committee, the Society and the corresponding Institution, and must acquire permission from the particular institution in order to advertise the details. The report must be completely duplicated where the Society and the corresponding Institution must be informed if the document is acquired

to be revealed for a certain intention. Fragments extracted from the context are not approved.

10.12 Expenses

The EP shall be in charge of all the costs that arises from conducting the activities in conjunction with the approval and accreditation of the programmes (Full Accreditation and Re-Accreditation)

10.13 Publication of Accreditation Status

The Society manages the list of accredited programmes on a continual basis which is updated regularly on its website. Every programme is provided with a nominated term of accreditation including a detailed completion date. The term of accreditation contains all first intakes of students for the year of the completion date.

Educational institutions are allowed to advertise the statements to the extent that some of the programmes are accredited by the Society. An institution is accountable to ensure the precision of the assertion, specifically to prevent assertions that may signify that some programmes are accredited when it is not.

11.0 Manual Revision

MBOT reserves the right at any time to make any amendments to the manual. Any recent amendments will be communicated to all EP prior enforcement.

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12.0 Accreditation Document

This part is outlined in order to the EPs in the preparation of its submission for Provisional and Full Accreditation, and Re- Accreditation of a programme.

12.1 Provisional and Full Accreditation

All the seven criteria of assessment with illustrative examples are covered in the Provisional and Full Accreditation submission guidelines. Related information with evidence that supports and best justify their specific case is required from the EP. Apart from that, any additional information that are not specifically justified in these guidelines but are found to be useful for the assessment purpose should also be provided by the EP.

All the information given by the EP for its submission should be honest and precise.

12.2 The Documentation Required

EPs must submit the documents listed below in order to apply for Provisional or Full Accreditation. For Provisional Accreditation, the EP must submit the SRR01 which requires for:

Form A: General Information regarding the Eps which is an institutional profile of the EP.

Form B: Programme Description Form B of the SRR01 which acquires the EP to supply information regarding the Technology and Technical Programme Accreditation Manual 2019. The information acquired consists of the name of the programme based on nomenclature MBOT, the MBOT technology fields, National Education Code, the MQF level, the graduating credits, the duration of study, mode of delivery and the awarding body.

Form C: General Criteria of the SRR01 which acquires the EP to supply information on all the standards in the seven criteria of evaluation for quality assurance of the programme to be accredited.

The EP must submit the SRR02 form in order to obtain Full Accreditation which contains the updated information of Form A, B, and C. However, Form C in SRR02 requires a self-review exercise using the evaluation instrument. The Self-Review Report generated through the evaluation instrument should include the following in each of the seven criteria of evaluation:

i. Strength/Commendation;
ii. Steps taken to maintain and enhance the strength/current practices;
iii. Areas of Concern/Weakness/Condition;
iv. Steps taken to address the problem areas.

Submissions for both Provisional and Full Accreditation must be accompanied by relevant attachments, appendices and supporting documents as indicated in the submission template.

EP can use Appendix B as checklist for self assessment in applying the accreditation under MBOT.

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Self-Review Report 01/02

for the

<Program Name>

<Nama Program>

at

<University Name>

<Location>

<Date>

CONFIDENTIAL

The information supplied in this Self-Review Report is for the confidential use of TTAC and its authorized agents and will not be disclosed without authorization of the institution concerned, except for summary data not identifiable to a specific institution.

FORM A : GENERAL INFORMATION ON THE EDUCATION PROVIDER

EDUCATION PROVIDER (EP)	
Name of the EP :	
Date of establishment:	
VC / CEO :	
Email :	
Address :	
Correspondence (if different from above) :	
Tel :	
Website :	

1. Provide the latest organisational chart of the EP.

2. Number of overall academic staff:

Status	Academic Qualification	Number of Staff		
		Malaysian	Non- Malaysian	Total
Full-time (all types of designation, including those on 1 year contract or more)	Doctorate (Level 8)			
	Masters (Level 7)			
	Bachelors (Level 6 -including professional qualification)			
	Diploma (Level 4)			
	Others			
	Sub-total			
Part-time	Doctorate (Level 8)			
	Masters (Level 7)			
	Bachelors (Level 6 -including professional qualification)			
	Diploma (Level 4)			
	Others			
	Sub-total			
Total				

3. Number of students past 3 years:

	Year	Number of students		Total	Disabled Student
		Local	International		
Past 1 year					
Past 2 years					
Past 3 years					

4. Student attrition rate:

	Year	Total students (A)	Number of students leaving without graduating (B)	Main reasons for leaving	Attrition Rate (%) (B/A)*100
Past 1 year					
Past 2 years					
Past 3 years					

5. Contact person for study information

i. Name and Title :
ii. Designation :
iii. Tel :
iv. Fax :
v. Email :

FORM B: PROGRAMME DESCRIPTION

1. Name of the programme (as in the scroll to be awarded):
2. MBOT Technology Fields :
3. National Education Code (NEC):
4. MQF level:
5. Graduating credit:
6. Type of award (e.g., single major, double major, etc.):
7. Language of instruction:
8. Type of programme (e.g., home grown, collaboration etc.):
9. Awarding body (e.g., own/others (with a evidence of collaboration)):
10. Mode of study (e.g., full-time/part-time):
11. Teaching Method (e.g., lecturer, laboratory, tutorial, project etc.):
12. Mode of offering: (please (/) where appropriate)

Undergraduate Programme	
Coursework	
Industry Mode (2u2i)	
Others	

13. Mode of delivery (please (/) as appropriate):

Conventional	
Open and Distance learning (ODL)	

14. Duration of study:

	Full-time		Part-time	
	Long Semester	Short Semester	Long Semester	Short Semester
No. of Weeks				
No. of Semesters				
No. of Years				

FORM C: GENERAL CRITERIA

Criteria 1 : Programme Design And Delivery

1. Vision and Mission Statement of EP

Vision Statement	
Mission Statement	

2. List of PEOs with respective KPI, monitoring and evaluation mechanism

	Statement	KPI	Evidence of stakeholders engagement
PEO1			
PEO2			
PEOxn			

Description of PEO evaluation mechanism	

3. Statement of Relation between PEO and EP's vision and mission

Relation between PEO and EP's vision and mission	

4. List of PLOs with respective KPI, monitoring and evaluation mechanism

	Statement
PLO1	
PLO2	
PLO3	
PLO4	
PLO5	
PLO6	
PLO7	
PLO8	
PLO9	

Description of PLO evaluation mechanism	

5. Mapping of Learning Outcomes and Learning Domains

   a. Mapping of PEO and PLOs

PEO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
PEO1									
PEO2									
PEO3									

   b. Mapping of EP's PLO vs. MBOT's PLO (if any)

PLO PPT	PLO MBOT									
	PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
	PLO1									
	PLO2									
	PLO3									
	PLO4									
	PLO5									
	PLO6									
	PLO7									
	PLO8									
	PLO9									

   c. Mapping Course-PLO with respect to Learning Taxonomy (Bloom's, Simpson's, Krathwohl's or equivalent)

Courses	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
Course1	C3	P2					A3		
Course2			C5		A4				
Course3		P3						A2	

6. Curriculum Structure & Compliance to Technology Components
   a. Refer Table 13.0 – Curriculum Structure

7. Mapping Course -Technology/Technical Services

   a. Refer Table 14.0 Mapping Course –Technical Services - Example: Biotechnology (BT) – Diploma below.

b. Refer Table 15.0 Mapping Course –Technology Services - Example: Biotechnology (BT) – Bachelor Degree below.

8. Detail of Teaching Plan
9. Description of learning outcome attainment evaluation mechanisms
10. Description of procedures on programme design, review and evaluation
11. Description of adoption of various teaching-learning methods
12. Final Year Project
13. Industrial Training / Apprenticeships (Including agreement)
14. Market Survey and Need Analysis (Eg : Industry Need, ILMIA, TalentCorp
15. Reports on engagement with stakeholders

Table 13.0 – Curriculum Structure

Year	Semester	Code	Course Name	Component	Credit Hours	Face-to-Face / Guided Learning (Actual Contact Hours)		DL, IG and IL
						Theory / Knowledge Related Component	Practical	Industry Mode Component (State mode 2u2i,WBL, etc)
1	1	DUBXXX2	Pengajian Malaysia	General	2	N/A	N/A	
1	1	DUEXXX2	Communicative English 1	General	2	N/A	N/A	
1	1	DBMXXX3	Technology Mathematics 1	Technology	3	56	42	
1	1	DBSXXX2	Technology Science	Technology	2	14	56	
1	1	DETXXX3	Electrical Technology	Technology	3	42	56	
1	1	DETXXX2	Electrical Wiring	Technology	2	14	56	
1	1	DEEXXX2	Measurement	Technology	2	42	14	
Year 1 Semester 1 Total Credit					**16**			
1	2	DUAXXX2	Sains Teknologi	General	2	N/A	N/A	
1	2	DUBXXX2	Nilai Masyarakat Malaysia**			N/A	N/A	
1	2	DRSXXX1	Sukan	General	1	N/A	N/A	
1	2	DRBXXX1	Unit Beruniform 1	General		N/A	N/A	
1	2	DBMXXX3	Enginering Mathematics 2	Technology	3	28	70	
1	2	DETXXX3	Electrical Circuit	Technology	3	56	42	
1	2	DEEXXX3	Semiconductor Devices	Technology	3	28	70	
1	2	DEEXXX4	Digital Electronic	Technology	4	70	70	
1	2	DECXXX2	Fundamental Programming	Technology	2	14	56	
Year 1 Semester 2 Total Credit					**18**			
Year 1 Total Credit					**34**			
2	1	DUEXXX2	Communicative English 2	General	2	N/A	N/A	
2	1	DRKXXX2	Kelab/Persatuan	General	2	N/A	N/A	
2	1	DRBXXX2	Unit Beruniform 2			N/A	N/A	
2	1	DEEXXX3	Electronic Circuits	Technology	3	56	42	
2	1	DEEXXX3	Electronic Equipment Repair	Technology	3	42	56	

2	1	DEPXXX3	Communication System Fundamentals	Technology	3	28	70	
2	1	DETXXX3	Power System	Technology	3	56	42	
Year 2 Semester 2 Total Credit					**16**			
2	2	DUEXXX2	Communicative English 3	General	2	N/A	N/A	
2	2	DBMXXX3	Electrical Technology Mathematics	Technology	3	56	42	
2	2	DECXXX3	Computer Networking Fundamentals	Technology	3	28	70	
2	2	DECXXX2	Embedded System Application	Technology	2	42	56	
2	2	DEJXXX3	Programmable Logic Controller (PLC) & Automation	Technology	3	28	70	
2	2	DEEXXX2	Interactive Mutimedia Applications	Technology	2	30	78	
Year 2 Semester 2 Total Credit					**15**			
Year 2 Total Credit					**33**			
3	1	DUAXXX2	Komunikasi & Penyiaran Islam	General	2	N/A	N/A	
3	2	DPBXXX2	Entrepreneurship	General	2	N/A	N/A	
3	2	DEEXXX2	Project 2	Technology	2	14	56	WBL
3	2	DEEXXX3	Cmos Integrated Circuit Design	Technology	3	56	42	WBL
3	2	DETXXX3	Electrical Machine	Technology	3	42	56	
3	2	DETXXX3	Power Electronics	Technology	3	28	70	
3	2	DEEXXX2	Circuit Analysis	Technology	2	14	56	
Year 3 Semester 1 Total Credit					**17**			
2	12	DUTXXX0	Industrial Training	Technology	12	56	42	WBL
Year 3 Semester 2 Total Credit					**12**			
Year 3 Total Credit					**17**			
					94			

Courses Clasification	Credit Hours EP
General Component	17
Technology Component	77
Total Credit Hours	**94**

Theory Compenent	Practical Compenent
940	1380
41%	59%

Table 14.0 Mapping Course –Technical Services - Example: Biotechnology (BT) – Diploma

Technology Profiles	Expected Technology Competency	Course Code	Courses	Topics	SLT
Testing	Test selection and planning (procedure)				
	Testing procedure				
	Diagnosis procedure				
Commissioning	Commissioning Planning				
	Handover planning / process (checklist)				
	Verification & Calibration				
Maintenance	Planning of maintenance schedule				
	Maintenance process (checklist)				
	Improvement planning for product maintenance				

Table 15.0 Mapping Course -Technology Services - Example: Biotechnology (BT) – Bachelor Degree

Technology Profiles	Expected Technology Competency	Course Code	Courses	Topics	SLT
Development	Problem identification				
	Propose Solution				
	Experimental design				
	Risk analysis				
Manufacturing	Proof of concept/prototype				
	Quality approach concept				
Testing	Test selection and planning (procedure)				
	Testing procedure				
	Diagnosis procedure				
Commissioning	Commissioning Planning				
	Handover planning / process				
	Verification & Calibration				
Maintenance	Planning of Maintenance				
	Maintenance process (checklist)				
	Improvement planning for				

Criteria 2 : Student Assessment

1. Relationship between Assessment and Graduate Attribute

2. Description of assessment regulation and policies including:

    a. Feedback mechanism on student performance
    b. Vetting of final examination.
    c. External advisor input.
    d. Strong room regulation.
    e. Grading system.
    f. Appeal mechanism.
    g. Endorsement of results.
    h. Attainment of learning outcomes.
    i. Handbook on academic regulations.
    j. Handling of students' assessment record.

3. Process on development of assessment method:

    a. Process to ensure construction alignment.
    b. Mapping of CLO, PLO, and PEO.
    c. CLO assessment methods and KPI.
    d. CQI on CLO, PLO, and PEO.

4. Assessment of student course performance:

    a. Final assessment
    b. Coursework
    c. Project (max. 4 students in a group)
    d. Final year project (max. 4 students in a group)
    e. Capstone project (max. 4 students in a group)
    f. Industrial training

Criteria 3 : Students Selection And Support Service

1. Policy and procedures on application/ student selection.
2. Programme entry requirement(s)
3. Programme entry requirement in *Bahasa*
4. Estimated date of first intake: month/year (applicable for provisional accreditation)
5. Projected intake and enrolment: (applicable for provisional accreditation)

Year	Intake	Enrolment
Year 1	e.g.:100	e.g.: 100
Year 2	e.g.:100	e.g.: 200
Year 3	e.g.:100	e.g.: 300
Total	e.g.:300	e.g.: 300

6. Total student enrolment (applicable for full accreditation):

Year	Intake	Enrolment
Year 1	e.g.: 60	e.g.: 60
Year 2	e.g.: 70	e.g.: 130
Year 3	e.g.: 90	e.g.: 220
Total	e.g.:220	e.g.: 220

7. Communicating criteria and policy on students selection to the public.
8. Description of policy and procedures on appeals.
9. Description of policy, regulations, procedures and students/public awareness on articulation/ student transfer.
10. Description of policy, regulations and procedures on credit transfer.
    a. Vertical
    b. Horizontal
    c. Residential year
11. Description of policy, regulations and procedures on course exemption.
12. List of support services provided for students.

13. Evidence on adequate and qualified staff in providing counselling for students.

14. Evidence on student participation in extra-curricular activities.

15. Description of regulations, processes and functions of student representative organization.

16. Establishment/effort on establishing Student Technologist Chapter.

17. Linkages to alumni and activities involving alumni.

Criteria 4 : Teaching And Support Staff

1. Description of recruitment policy, criteria & process of teaching staff.

2. List of academic staff with academic qualifications & industrial experience

3. Industry mentor for industrial based programme.

4. Description of policy on research, publication, product development and consultation.

5. Description of recruitment policy and criteria for technical support staff.

6. List of technical support staff with academic, skills, professional qualifications (QT, GT-MBOT) and industrial experience.

7. Adequate technical staff with respect to number of teaching facility.

8. Recruitment policy and criteria for administrative support staff.

9. List of administrative staff with academic and professional qualifications.

10. Adequate administrative staff to support the programme.

11. Mechanism of continuous and career development for staff. (Academic, Technical Support, Administrative)

12. Industry engagement involving teaching staff.

13. Annual staff performance evaluation system.

14. Evaluation of teaching staff by students.

15. Structured teaching and learning training for new teaching staff.

16. Educators Certification

Criteria 5 : Educational Resources

1. List of physical facilities for teaching and learning activities.
2. List of equipment of HT and HV.
3. Maintenance of facilities and equipment.
4. List of facilities provided for well being of students e.g. hostel, café, CCTV, sport and recreational, health center, student center and transportation, among others.
5. List of research and development facilities.
6. Incorporation of research and development in the learning ecosystem.
7. Allocation for operation and maintenance of programme.
8. Responsibilities and autonomy of department in budgeting and resource distribution.
9. Description of procedures in managing financial resources, viability and sustainability of programme.

Criteria 6 : Programme Management

1. Description of governance structure of programme.
2. Description of policies, principles, rules and guidelines on programme governance.
3. Qualifications of programme leader
4. Description of policy or procedures in managing students records on:
    a. Admission
    b. Performance
    c. Completion
    d. Graduation.

Criteria 7 : Quality Management System

1. Description of governance structure of EP.
2. Description of leadership at departmental level.

3. Description of policies and relationships between department with stakeholders in:

    a. Collegiality and clarity.
    b. Finance management.
    c. Other resources.
    d. Programme delivery.
    e. Research.
    f. Consultancy.

4. Description of governance aspect in institutional acts.

5. Description of department autonomy.

6. Resources to attract, maintain, award and administer continued professional establishment of staff.

7. Resources to acquire, maintain and operate infrastructures, facilities and equipment.

8. Description of stakeholders (students, alumni, employers, professional bodies, teaching staff and informed citizens) engagement/ feedback to improve programme.

9. Programme advisory committee comprise of professionals, industry representatives, external academic evaluators, subject-matter experts, alumni and other relevant stakeholders.

10. Student representative feedback.

11. Report on the monitoring, review and evaluation of:

    a. Governance.
    b. Institutional process.
    c. Functions and report of examination committee.
    d. Curriculum outcomes, content, delivery and assessment.
    e. Students performance (PLO attainment).
    f. Graduates achievement (PEO attainment).

12. Benchmarking on QMS conducted.

13. Components of continual quality improvement:

    a. Curriculum and core courses review at least once every programme cycle.
    b. External advisor report at least once in 2 years.
    c. Industry advisor report at least once in 2 years.

d. Progressive evaluation of practical and industrial attachment practices.
e. Calibration of equipment at regular interval.
f. Linkages and involvement with industry.
g. Dialogue session with stakeholders at least once every programme cycle.
h. Keynote speech in relevant field.
i. Active academic staff participations in conference/ seminar/ workshop/ short course.
   Organisation of conference/ seminar/ workshop.

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References

Accreditation Agency Specialized in Accrediting Degree Programs in Engineering, Informatics, the Natural Sciences and Mathematics (ASIIN)
ASIIN (2015). Criteria for the Accreditation of Degree Programmes – ASIIN Quality Seal (Engineering, Informatics, Architecture, Natural Sciences, Mathematics, individually and in combination with other Subject Areas. Available : <https://www.asiin.de/en/quality-management/accreditation-degree-programmes/quality-criteria.html>

Accreditation Board for Engineering Education of Korea (ABEEK)
ABEEK (2015). Criteria For Accrediting Engineering Programs (KEC2015). Available : <http://www.abeek.or.kr/appraisal/eac/>

Australian Computer Society (ACS)
ACS (2016). Professional Level and Advanced Professional Level Programs. Available : <https://www.acs.org.au/content/dam/acs/acsdocuments/ACS%20Accreditation%20-%20Document%202%20Application%20Guidelines%20-V2.1.pdf>

Accreditation Board for Engineering and Technology (ABET)
ABET (2018). 2019-2020 Criteria for Accrediting Programs. Available : https://www.abet.org/accreditation/accreditation-criteria/.

Malaysian Qualifications Agency (MQA)
MQA (2018). Code of Practice for Programme Accreditation, Second Edition

Ministry of Higher Education (MOHE) Malaysia
KPT (2009 – 2017) Kompilasi Dasar Jaminan Kualiti Pendidikan Tinggi 2009-2017 (Edisi Kedua)

Schall, S. O. (2017). Engineering the accreditation process. American Society for Engineering Education. Paper ID#20279.

Appendix

Appendix A - Technology and technical competencies for the 23 MBOT technology fields

Appendix B - TTAC MBOT Checklist of Documents For Accreditation of Programme

Appendix C – Flow Chart Provisional Accreditation

Appendix D - Flow Chart Full Accreditation

Appendix E - Flow Chart Continuing Full Accreditation

Appendix F - Flow Chart Transition Accreditation

Appendix A

The following are the expected technology and technical competencies for the MBOT technology fields:

1. **Biotechnology Technology Profiles**
   Biotechnology is the use of living system to develop, modify or make products which consist of healthcare, agriculture and Industrial / Manufacturing.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
BIOTECHNOLOGY TECHNOLOGY	**Development**	• Problem identification • Propose solution • Experimental design • Risk analysis	**NOT APPLICABLE**	
	Manufacturing	• Proof of concept/Prototype • Quality approach concept		
	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning • Handover planning / process (checklist) • Verification & Calibration	**Commissioning**	• Installation • Reporting
	Maintenance	• Planning of maintenance schedule • Maintenance process (checklist) • Improvement planning for product maintenance	**Maintenance**	• Perform Maintenance Task • Pre/Post for Operation • Complete service report

2. Chemical Technology Profiles

Chemical technology is the use of a organic and inorganic material to develop, modify, service or make products which consists of commodity and specialty/fine chemical.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
CHEMICAL TECHNOLOGY	**Development**	• Problem identification • Propose solution • Experimental design • Risk analysis	**NOT APPLICABLE**	
	Manufacturing	• Proof of concept/Prototype • Quality approach concept		
	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning • Handover planning / process (checklist) • Verification & Calibration	**Commissioning**	• Installation • Reporting
	Maintenance	• Planning of maintenance schedule • Maintenance process (checklist) • Improvement planning for product maintenance	**Maintenance**	• Perform Maintenance Task • Pre/Post for Operation • Complete service report

3. **Food Technology Profiles**

Food Technology is the application of food science in the selection, preservation, packaging, processing, distribution and use of safe foods.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
FOOD TECHNOLOGY	**Development**	• Concept Generation and selection • Proof of concept/prototype • Food Sampling • Consumer Testing • Cost Analysis • Shelf life testing • Scale-up	**NOT APPLICABLE**	
	Manufacturing	• Processing monitoring • Preservation monitoring • Plant layout design		
	Testing	• Chemical analysis • Physical Analysis • Microbiological analysis • Sensory Evaluation	**Testing**	• Chemical testing • Physical testing • Microbiological testing • Sensory Evaluation
	Commissioning	• Raw material specification • Product and process specification • Process monitoring system • Packaging Design	**Commissioning**	• Raw Material handling • Food processing • Food preservation • Packaging
	Maintenance	• Food quality programmes (QA, QC, Halal) • Food safety programmes (GMP, HACCP) • Product storage management	**Maintenance**	• Food quality programmes (QA, QC, Halal) • Food safety programmes (GMP, HACCP) • Product storage/movement

4. Agro-Based Technology Profiles

Agro-based Technology involves the process and technique of cultivating, breeding and processing of the agro produce.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
AGRO-BASED TECHNOLOGY	**Development**	• Develop agricultural production systems for new crops and/or new farm animals	**NOT APPLICABLE**	
	Manufacturing	• Configure new crops and/or new farm animal production system based on field trials and product commissioning data. • Monitor production data for further improvements		
	Testing	• Design field trials for new agricultural production system for new crops and/or farm animals • Analyse data from field trials • Reconfigure trial parameters to improve the production systems	**Testing**	• Carry out fields trials as prescribed • Collect data from fields trials (sampling/ measurements/ lab test)
	Commissioning	• Plan and prepare production system for full scale production • Finalize production parameters for the new production system at full scale production level based on trial data	**Commissioning**	• Prepare production system for full scale production
	Maintenance	• Plan maintenance schedule for agricultural machinery and equipment	**Maintenance**	• Perform maintenance of agricultural machinery and equipment

		• Monitor maintenance process • Analyse and improve on maintenance process		

5. Automotive Technology Profiles

Automotive Technology is an application, method and process of automotive industry which involves design, development, manufacturing, marketing, maintenance and servicing.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
AUTOMOTIVE TECHNOLOGY	**Development**	• Concept Generation and Selection • Sketching • Drawing • Modelling • CAE	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance • Fabricate / Prototype		
	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Perform Maintenance • Reporting

6. Aviation & Aerospace Technology Profiles

Aviation and Aerospace Technology is the practical application of aeronautic design, development, production, operations, maintenance processes and use of aircraft including its component and various system.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
AEROSPACE & AVIATION TECHNOLOGY	**Development**	• Product Design • Product Configuration • Stress Analysis • Fatigue & Damaged Tolerance • Tooling Design	**NOT APPLICABLE**	
	Manufacturing	• CAD/CAM • Process Control • Production Planning • System Integration • Quality Assurance		
	Testing	• Assembly, Integration & Testing (AIT) • Non-Destructive Test (NDT)	**Testing**	• Assembly, Integration & Testing (AIT) • Non-Destructive Test (NDT)
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Equipment Maintenance • Tooling Maintenance • Facility Maintenance	**Maintenance**	• Equipment Maintenance • Tooling Maintenance • Facility Maintenance

7. **Transportation & Logistic Technology Profiles**
   Transportation and Logistic Technology is a method and technique to carry or move people or goods by various modes using land, sea and air.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
TRANSPORTATION & LOGISTIC TECHNOLOGY	**Development**	• Concept generation and selection • Sketching & Modelling • Cost and Benefit Analysis • Feasibility Study (Transport Environmental Impact Assessment) • Electronic Data Interchange (EDI)	**NOT APPLICABLE**	
	Manufacturing	• Prototyping		
	Testing	• Test selection and planning (procedure) • Audit and Quality Control	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning • Handover planning / process	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Perform Maintenance • Evaluation & Reporting

8. Maritime Technology Profiles

Maritime Technology involves the technique and method used in operation, maintenance, manufacturing, navigation and control system of ships and related marine vessel including technology and technique used in ports, oil rigs and other marine facilities.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
MARITIME TECHNOLOGY	**Development**	• Conceptual Design of Ship • Ship Scantling • Ship System Drawing & Modelling • Analyse of Ship (Simulation) • Cost Analysis, Shipyard Project & Risk Management	**NOT APPLICABLE**	
	Manufacturing	• Ship Building / Ship Repair • Ship Production Planning • Ship Resistance and Powering		
	Testing	• Hull and Marine Machinery Test selection and planning (SOP) • Diagnostic procedure • Technical Report • Quality Management	**Testing**	• Hull and Ship Machinery Standard Testing • Test Data Collection • Standard Diagnostic and Report • Quality System
	Commissioning	• Machinery System Commissioning and Planning • Ship Delivery and Handover planning / process (checklist) • Safety Regulation and management	**Commissioning**	• Shipyard Safety Regulation • Ship system Installation • Reporting

	Maintenance	• Planned Ship Maintenance / Repair schedule • Maintenance process (checklist) • Analysis, Report & Improvement planning	**Maintenance**	• Perform Maintenance / Repair Task • Reporting

9. Information & Computing Technology Profiles

Information and Computing Technology is a method of using computer technology that involves hardware and/or software to produce meaningful information or outcome.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
INFORMATION & COMPUTING TECHNOLOGY	**Development**	• User Requirement • Analysis • Design • User Manual Documentation • Technical Documentation	**NOT APPLICABLE**	
	Manufacturing	• Software & Hardware production • Application structure and programming process		
	Testing	• Test Script • Test SOP • User Acceptance Test	**Testing**	• Software and hardware test • Acceptance test
	Commissioning	• Installation & Configuration, • Commissioning Report	**Commissioning**	• Infrastructure preparation
	Maintenance	• Plan maintenance schedule, • Continuous Quality Improvement Plan	**Maintenance**	• Product support • Troubleshooting

10. Cyber Security Technology Profiles

Cyber Security Technology is an applied body of knowledge in the process, practice, design and technique to protect information, data and networks in preserving the CIA (Confidentiality, Integrity and Availability).

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
CYBER SECURITY TECHNOLOGY	**Development**	• Risk identification • Best practices • White paper • Security standards	**NOT APPLICABLE**	
	Manufacturing	• Developing policies • Developing procedures • Configuration setting • Access control list • Secure network architecture • Public Key Infrastructure • Documentation • Business continuity		
	Testing	• Vulnerability assessment • Penetration testing • Common criteria evaluation Reporting • Test	**Testing**	• Data collection • Red team exercise
	Commissioning	• Common criteria certification • Information security management system certification • Payment card industry / Data security standard certification	**Commissioning**	• Installation • Reporting
	Maintenance	• Log review	**Maintenance**	• Perform Maintenance

		• Audit • Incident handling • Management review • SIEM operation		• Technical Report

11. Art Design & Creative Multimedia Technology Profiles

Art Design and Creative Multimedia Technology involves the process, technique and application of technology to produce creative content.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
ART DESIGN & CREATIVE MULTIMEDIA TECHNOLOGY	**Development**	• Concept Generation and Selection • Design Research • Design Process • Sketching • Drawing • Modelling	**NOT APPLICABLE**	
	Manufacturing	• Building Supervision • Product Determination • Content Planning • Content Development • Shooting • Editing • Building • Content Design		
	Testing	• Supervision • Programming • Technical Run	**Testing**	• Installation • Programming • Operation

		• Quality Assurance		• Preview
	Commissioning	• Performance (show time) • Screening • Product Delivery	**Commissioning**	• Performance (show time) • Product Delivery • Technical Check
	Maintenance	• Log review • Product review • Product Report	**Maintenance**	• Technical Report

12. Electrical & Electronics Technology Profiles

Electrical and Electronic Technology involves the process, technique and application of any electrical and electronics related works.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
ELECTRICAL & ELECTRONICS TECHNOLOGY	**Development**	• Concept Generation and Selection • Benchmarking • Drawing • Modelling • Proof of Concept (POC) • Prototyping • Technical Documentation	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance • Fabricate		
	Testing	• Test selection and planning (procedure) • Testing	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic

		• Diagnostic and troubleshoot (Diagnostic more to system, troubleshoot more to focused component) • Verification		
	Commissioning	• Commissioning Planning (Site) • Handover planning/process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Performance Maintenance • Reporting

13. Telecommunications & Broadcasting Technology Profiles

Telecommunication and Broadcasting Technology involves the process, technique and application to enable production and transmission of content.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
TELECOMMUNICATIONS & BROADCASTING TECHNOLOGY	**Development**	• Concept Generation and Selection • Benchmarking • Drawing • Modelling • Proof of Concept (POC) • Prototyping • Technical Documentation	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance • Fabricate		

	Testing	• Test selection and planning (procedure) • Testing • Diagnostic and troubleshoot (Diagnostic more to system, troubleshoot more to focused component) • Verification	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning/process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Performance Maintenance • Reporting

14. Manufacturing & Industrial Technology Profiles

Manufacturing and Industrial Technology involves the process and technique of producing a component or product or an assembly of components.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
MANUFACTURING & INDUSTRIAL TECHNOLOGY	**Development**	• Product Drafting and Specification • Sketching • Drawing • Modelling • Analyse FEA • Prototype	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance		

		• Manufacturing Process • Quality Control • Production Instruction • Production Planning and Control • risk Assessment		
	Testing	• Quality Assurance • Testing Procedure • Production Standard	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Performance Maintenance • Reporting

15. Green Technology Profiles

Green Technology involves the process and technique of applying sustainable and environmental friendly approach in any human activities.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
GREEN TECHNOLOGY	**Development**	• Concept generation and selection • Benchmarking	**NOT APPLICABLE**	
	Manufacturing	• Prototyping / Fabrication		
	Testing	• Develop procedure • Testing • Diagnosis procedure • Inspection on installation	**Testing**	• Standard Testing • Data collection • Standard diagnostic
	Commissioning	• Commissioning planning (site)	**Commissioning**	• Installation and auditing

		• Handover planning / process (checklist) • Verification of report		• Reporting
	Maintenance	• Planned maintenance schedule • Maintenance process • Analysis and improvement planning	**Maintenance**	• Performance Maintenance • Reporting

16. Building & Construction Technology Profiles

Building and Construction Technology involves the process, method and technique used in the construction of building and civil works

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
BUILDING & CONSTRUCTION TECHNOLOGY	**Development**	• Drawings & Survey • Feasibility • Analysis & Design • Estimating & Scheduling • Specifications and Contractual Documentation	**NOT APPLICABLE**	
	Manufacturing	• Risk Identification & Safety • Project Management (Work Scheduling & Reporting, Procurement & Coordination of Labour & Equipment) • Inspection & Supervision		
	Testing	• Equipment Selection • Testing Planning & Management • Testing Equipment Operations	**Testing**	• Standard Testing Operations

		• Standards & Specifications Compliance • Verifications		• Data Collection & Reporting • Supervision & Inspection
	Commissioning	• Management, Supervision & Inspection • Standards & Specifications Compliance	**Commissioning**	• Supervision on Commissioning • Inspection of Installation • Reporting
	Maintenance	• Defect Liability Period • Maintenance Scheduling & Operations • Analysis & Improvement Planning	**Maintenance**	• Defect Liability Period • Perform Maintenance • Reporting

17. Resource Based, Survey & Geomatics Technology

Resource Based, Survey & Geomatics Technology is an application and technique to identify, measure, use and preserve natural resources and to process spatially referenced information or data.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
RESOURCE BASED, SURVEY & GEOMATICS TECHNOLOGY	**Development**	• Concept Generation and Selection • Sketching • Drawing • Modelling (Not applicable for Survey) • Analyse FEA (Not applicable for Survey)	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance		
	Testing	• Test selection and planning (procedure)	**Testing**	• Standard Testing

		• Testing procedure • 3 Diagnosis procedure		• Data Collection Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Perform Maintenance • Reporting

18. Atmospheric & Environmental Science Technology Profiles

Atmospheric Science and Environment Technology involves the technique, study, process or application of related components in physics and chemistry to the earth's atmosphere and environment.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
ATMOSPHERIC & ENVIRONMENTAL SCIENCE TECHNOLOGY	**Development**	• Identification & Evaluation • Analysis & Design • Prevention & Control • Regulatories	**NOT APPLICABLE**	
	Manufacturing	• Management (Work Scheduling, Reporting, Procurement, Coordination of Labour & Equipment) • Inspection & Supervision		
	Testing	• Equipment Selection • Testing Planning & Management • Testing Equipment Operations • Regulatory Compliance	**Testing**	• Equipment Inspection and Maintenance • Laboratory & Field Standard Testing's

		• Verifications		• Data Collection • Regulatory Compliance
	Commissioning	• Management, Supervision & Inspection • Regulatory Compliance	**Commissioning**	• Installation • Reporting
	Maintenance	• Maintenance Scheduling & Operations • Analysis & Improvement Planning	**Maintenance**	• Perform Maintenance • Reporting

19. Marine Technology Profiles

Marine Technology involves process and technique used in studying, conserving, exploring, protecting and intervention of the marine environment.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
MARINE TECHNOLOGY	**Development**	• Design Features & Operative Mechanism of Machineries • Machineries & Operations Planning & Manage Management	**NOT APPLICABLE**	
	Manufacturing	• Plan And Schedule Operations		
	Testing	• Operations, Surveillance, Performance Assessment & Safety of Plant & Machinery	**Testing**	• Use of Tools & Measuring Instruments • Characteristics & Selection of Materials of Equipment • Interpretation of Drawings & Handbooks

	Commissioning	• Operation, Surveillance, Performance Assessment & Safety of Plant, Machineries • Human Resource Management & Safety	**Commissioning**	• Regulatory Compliance • Procedures & Equipment • Measures of Prevention, Control & Protection • Equipment Operations
	Maintenance	• Operations and Maintenance of Machineries & System • Safety Measures	**Maintenance**	• Maintenance & Repair of Machineries & Equipment

20. Oil & Gas Technology Profiles

Oil and Gas Technology involves the technology, process and technique used and implemented in oil and gas production.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
OIL & GAS TECHNOLOGY	**Development**	• Identify, detect and understand system or plant failure • Perform measurement and analysis • Prepare technical specification, Drawing and schematic diagram • Identify and understand regulatory requirement • Compliance with safety guideline • Conduct technology development and advancement	**NOT APPLICABLE**	
	Manufacturing	• GMP / Standard Compliance • Fabricate /prototyping • Prepare technical specification, characterization of product properties		

	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist) • Mitigation plan	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning • Predictive / preventive / unplanned Maintenance • Reverse engineering • Condition based monitoring	**Maintenance**	• Perform Maintenance • Reporting • Standard Monitoring

21. Nuclear & Radiological Technology Profiles

Nuclear and Radiologic Technology involves the process and technique of the use of nuclear reaction and radiation in medicine, healthcare and human activities.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
NUCLEAR & RADIOLOGICAL TECHNOLOGY	**Development**	• Identify, detect and understand system or plant failure • Perform measurement and analysis • Prepare technical specification, Drawing and schematic diagram	**NOT APPLICABLE**	

		• Identify and understand regulatory requirement • Compliance with safety guideline • Conduct technology development and advancement		
	Manufacturing	• GMP / Standard Compliance • Fabricate /prototyping • Prepare technical specification , characterization of product properties		
	Testing	• Develop procedure / protocol with compliance to safety • Develop checklist • Data analysis and reporting	**Testing**	• Perform checklist • Data collection • Adherence to safety procedures
	Commissioning	• Develop operation manual • Develop emergency preparedness and response • Evaluate and revised effectiveness of commissioning and emergency plan • Identify risk and environmental impact • Conduct safety culture activities	**Commissioning**	• Operation • Reporting • Adherence to safety procedures
	Maintenance	• Develop maintenance schedule and checklist • Data analysis, reporting and improvement planning • Conduct safety culture activities	**Maintenance**	• Perform maintenance with checklist • Reporting • Adherence to safety procedures

22. Material Technology Profiles

Material Technology involves a method or technique used to process, synthesize and produce material in specific shapes and forms for specific application.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
MATERIAL TECHNOLOGY	**Development**	• Concept Generation and Selection • Sketching • Drawing • Modelling • Analyse FEA	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance • Fabricate / Prototype		
	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist) • Mitigation plan	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning • Predictive / preventive / unplanned Maintenance • Reverse engineering • Condition based monitoring	**Maintenance**	• Perform Maintenance • Reporting • Standard Monitoring

23. Nano Technology Profiles

Nano Technology is the method or application that manipulate the individual atom and molecule of a matter to build microscopic (nanoscale) devices / service and products.

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
NANO TECHNOLOGY	**Development**	• Modelling include concept, sketch, drawing • Analysis • Identification Through Nano sensor / defector • Proses Flow	**NOT APPLICABLE**	
	Manufacturing	• Geometry, Dimensioning, Tolerance • Fabricate / Prototype		
	Testing	• Test selection and planning (procedure) • Testing procedure • Diagnosis procedure • Control procedure	**Testing**	• Standard Testing • Data Collection • Standard Diagnostic
	Commissioning	• Commissioning Planning (Site) • Handover planning / process (checklist)	**Commissioning**	• Installation • Reporting
	Maintenance	• Planned Maintenance schedule • Maintenance process (checklist) • Analysis & Improvement planning	**Maintenance**	• Perform Maintenance • Reporting • Standard Monitoring

24. Health & Medical Technology Profiles

Health and Medical Technology involves in the development and management of Health Facilities, Medical Devices, Health ICT, Infection Control, Clinical and E-Waste Management, and Mobile Health Facilities

Technology Fields	Technology Profiles	Expected Technology Competency	Technical Profiles	Expected Technical Competency
HEALTH & MEDICAL TECHNOLOGY	**Development**	• Technology Planning - Specification - Layout - Site Preparation - Mobilization - Storage • Technology Acquisition • Technology Development - Prototyping - Testing - Clinical Trial • Safety, Standard and Accreditation • Regulatory Compliance	**NOT APPLICABLE**	
	Manufacturing	• Production & assembly planning and management • Modification and refurbishment • Quality assurance and control • Labelling and packaging • Safety, standard and accreditation • Regulatory compliance		
	Testing	• Verification of technical specifications • Visual inspection • Performance test • Safety test • Compliance report	**Testing**	• Verification of technical specifications • Visual inspection • Performance test • Safety test • Compliance report
	Commissioning	• Licensing of equipment • Licensing of facility	**Commissioning**	• Licensing of equipment • Licensing of facility

		• User and technical training • Policy and Procedures • Systems Integration		• User and technical training • Policy and Procedures • Systems Integration
	Maintenance	• Equipment/system operation and technical specifications • Asset & inventory management • Warranty management • Schedule maintenance • Unscheduled maintenance • Calibration • Routine inspection • Predictive maintenance • Spare-part management • Service contract management • Safety, standard and accreditation • Adverse event investigation and reporting • Quality assurance and risk management • Recall, decommissioning and disposal • Regulatory compliance	**Maintenance**	• Equipment/system operation and technical specifications • Asset & inventory management • Warranty management • Schedule maintenance • Unscheduled maintenance • Calibration • Routine inspection • Predictive maintenance • Spare-part management • Service contract management • Safety, standard and accreditation • Adverse event investigation and reporting • Quality assurance and risk management • Recall, decommissioning and disposal • Regulatory compliance

Appendix B

TTAC MBOT CHECKLIST OF DOCUMENTS FOR ACCREDITATION OF PROGRAMME

Please select:	Provisional Accreditation	☐	Full Accreditation	☐	Continuing Accreditation	☐

Name of Programme :

MBOT Ref. No. :

MBOT Field :

Education Provider & Address :

Name of Faculty/School/Dept. :

Mode of Study :

Duration of Study :

EP Website :

Name of Liaison Officer & Phone Number :

ACCREDITATION REQUIREMENTS AND CRITERIA

Requirement/Criteria *Cross where applicable	**Compliance (Yes/No)**	**Location of Evidence in SRR**
Qualifying Requirements		
1. Minimum total credits (min. technology component)		
Bachelor Degree: 120 (80)		
Advanced Diploma: 40 (20)		
Diploma: 90 (60)		
Certificate: 60 (30)		
Bridging: 66(33)/ 36(18)/ 40(20)*		
2. Minimum duration of study		
Bachelor Degree: 3 years		
Advanced Diploma: 1 year		
Diploma: 2 years		
Certificate: 1 ¼ years		
3. Final year project (MQF Level 4 and above)		
4. Minimum period of industrial training		
Bachelor Degree: 8 weeks / 6 months		
Advanced Diploma: 8 weeks		
Diploma: 8 weeks / 3 months		
Certificate: 8 weeks		

Requirement/Criteria *Cross where applicable	Compliance (Yes/No)	Location of Evidence in SRR
5. Minimum number of full time teaching staff in the relevant field		
Bachelor Degree: 6 full time staff		
Advanced Diploma: 2 full time staff		
Diploma: 4 full time staff		
Certificate: 2 full time staff		
6. Minimum staff : student ratio		
Bachelor Degree: 1:15 or better		
Advanced Diploma: 1:20 or better		
Diploma: 1:20 or better		
Certificate: 1:20 or better		
7. At least one (1) teaching staff must be a Ts. or Tc. registered under MBOT or efforts towards complying the criteria		
8. External advisor's report		
9. Industry advisor's report		
Criteria 1: Programme Design and Delivery		
1. Vision and mission of EP		
2. List of PEOs with respective KPI, monitoring and evaluation mechanism		
3. Relation between PEO and EP's vision and mission		
4. List of PLOs with respective KPI, monitoring and evaluation mechanism		
5. Address the technology/technical services		
6. Market survey and need analysis		
7. Reports on engagement with stakeholders		
8. Procedures on programme design, review and evaluation		
9. Adoption of various teaching-learning methods		
10. Final Year Project		
11. Industrial Training / Apprenticeships (Including agreement)		
Criteria 2: Student Assessment		
1. Mapping of assessment to PLO		
2. Assessment regulation and policies, including: • Feedback mechanism on student performance • Vetting of final examination. • External advisor input. • Strong room regulation. • Grading system. • Appeal mechanism. • Endorsement of results. • Attainment of learning outcomes. • Handbook on academic regulations.		

Requirement/Criteria *Cross where applicable	Compliance (Yes/No)	Location of Evidence in SRR
• Handling of students' assessment record.		
3. Process on development of assessment method: • Process to ensure construction alignment. • Mapping of CLO, PLO, and PEO. • CLO assessment methods and KPI. • CQI on CLO, PLO, and PEO.		
4. Assessment of student course performance: • Final assessment • Coursework • Project (max. 4 students in a group) • Final year project (max. 4 students in a group) • Capstone project (max. 4 students in a group) • Industrial training		
Criteria 3: Student Selection and Support Service		
1. Policy and procedures on application/ student selection.		
2. Entry requirement for the programme.		
3. Communicating criteria and policy on students selection to the public.		
4. Policy and procedures on appeals.		
5. Policy, regulations, procedures and students/public awareness on articulation/ student transfer.		
6. Policy, regulations and procedures on credit transfer. • Vertical • Horizontal • Residential year		
7. Policy, regulations and procedures on course exemption.		
8. List of support services provided for students.		
9. Evidence on adequate and qualified staff in providing counselling for students.		
10. Evidence on student participation in extra-curricular activities.		
11. Regulations, processes and functions of student representative organization.		
12. Establishment/effort on establishing Student Technologist Chapter.		
13. Linkages to alumni and activities involving alumni.		
Criteria 4: Teaching and Support Staff		
1. Recruitment policy, criteria & process of teaching staff.		

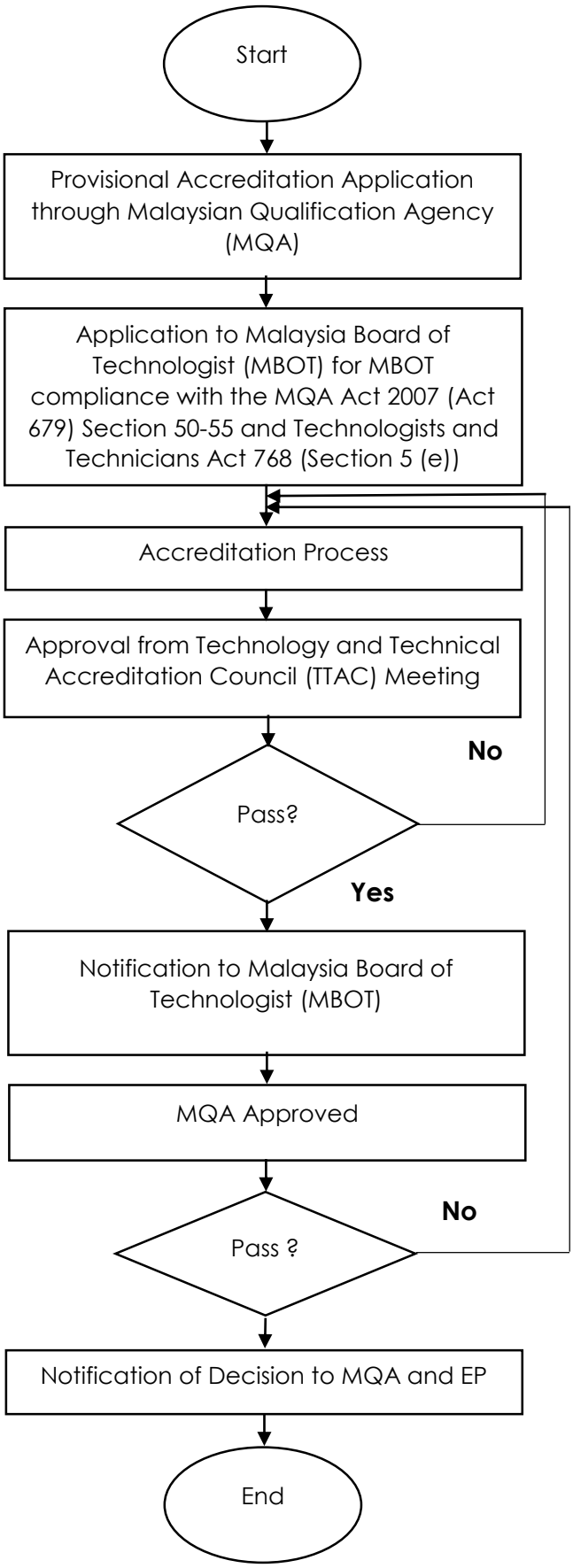
Requirement/Criteria *Cross where applicable	Compliance (Yes/No)	Location of Evidence in SRR
2. List of academic staff with academic qualifications & industrial experience:		
Bachelor Degree: At least Master OR Bachelor with min. 3 yrs. relevant industrial experience/ skills certification (max. 30% staff).		
Advanced Diploma to Certificate: At least Bachelor OR Diploma with min. 3 yrs. relevant industrial experience/ skills certification (max. 30% staff).		
Min. 5% of teaching staff with at least 1 yr. industrial experience.		
Staff competence for practical oriented courses		
3. Industry mentor for industrial based programme.		
4. Policy on research, publication, product development and consultation.		
5. Recruitment policy and criteria for technical support staff.		
6. List of technical support staff with academic, skills, professional qualifications (QT-MBOT) and industrial experience.		
7. Adequate technical staff with respect to number of teaching facility.		
8. Recruitment policy and criteria for administrative support staff.		
9. List of administrative staff with academic and professional qualifications.		
10. Adequate administrative staff to support the programme.		
11. Mechanism of continuous and career development for staff. (Academic, Technical Support, Administrative)		
12. Industry engagement involving teaching staff.		
13. Annual staff performance evaluation system.		
14. Evaluation of teaching staff by students.		
15. Structured teaching and learning training for new teaching staff.		
Criteria 5: Educational Resources		
1. List of physical facilities for teaching and learning activities.		
2. List of equipment of HT and HV.		
3. Maintenance of facilities and equipment.		
4. List of facilities provided for well being of students e.g. hostel, café, CCTV, sport and		

Requirement/Criteria *Cross where applicable	Compliance (Yes/No)	Location of Evidence in SRR
recreational, health center, student center and transportation, among others.		
5. List of research and development facilities.		
6. Incorporation of research and development in the learning ecosystem.		
7. Allocation for operation and maintenance of programme.		
8. Responsibilities and autonomy of department in budgeting and resource distribution.		
9. Procedures in managing financial resources, viability and sustainability of programme.		
Criteria 6: Programme Management		
1. Governance structure of programme.		
2. Policies, principles, rules and guidelines on programme governance.		
3. Qualifications of programme leader:		
Bachelor Degree & Advanced Diploma: Master in related field with 3 yrs. academic experience OR Bachelor in related field with 5 yrs. academic experience.		
Diploma & Certificate: Bachelor in related field with 3 yrs. academic experience OR Diploma in related field with 5 yrs. academic experience.		
4. Policy or procedures in managing students records on: • Admission • Performance • Completion • Graduation.		
Criteria 7: Quality Management System		
1. Governance structure of EP.		
2. Leadership at departmental level.		
3. Policies and relationships between department with stakeholders in: • Collegiality and clarity. • Finance management. • Other resources. • Programme delivery. • Research. • Consultancy.		
4. Governance aspect in institutional acts.		
5. Department autonomy.		
6. Resources to attract, maintain, award and administer continued professional establishment of staff.		

Requirement/Criteria *Cross where applicable	Compliance (Yes/No)	Location of Evidence in SRR
7. Resources to acquire, maintain and operate infrastructures, facilities and equipment.		
8. Stakeholders (students, alumni, employers, professional bodies, teaching staff and informed citizens) engagement/ feedback to improve programme.		
9. Programme advisory committee comprise of professionals, industry representatives, external academic evaluators, subject-matter experts, alumni and other relevant stakeholders.		
10. Student representative feedback.		
11. Report on the monitoring, review and evaluation of: • Governance. • Institutional process. • Functions and report of examination committee. • Curriculum outcomes, content, delivery and assessment. • Students performance (PLO attainment). • Graduates achievement (PEO attainment).		
12. Benchmarking on QMS conducted.		
13. Components of continual quality improvement: • Curriculum and core courses review at least once every programme cycle. • External advisor report at least once in 2 years. • Industry advisor report at least once in 2 years. • Progressive evaluation of practical and industrial attachment practices. • Calibration of equipment at regular interval. • Linkages and involvement with industry. • Dialogue session with stakeholders at least once every programme cycle. • Keynote speech in relevant field. • Active academic staff participations in conference/ seminar/ workshop/ short course. • Organisation of conference/ seminar/ workshop.		

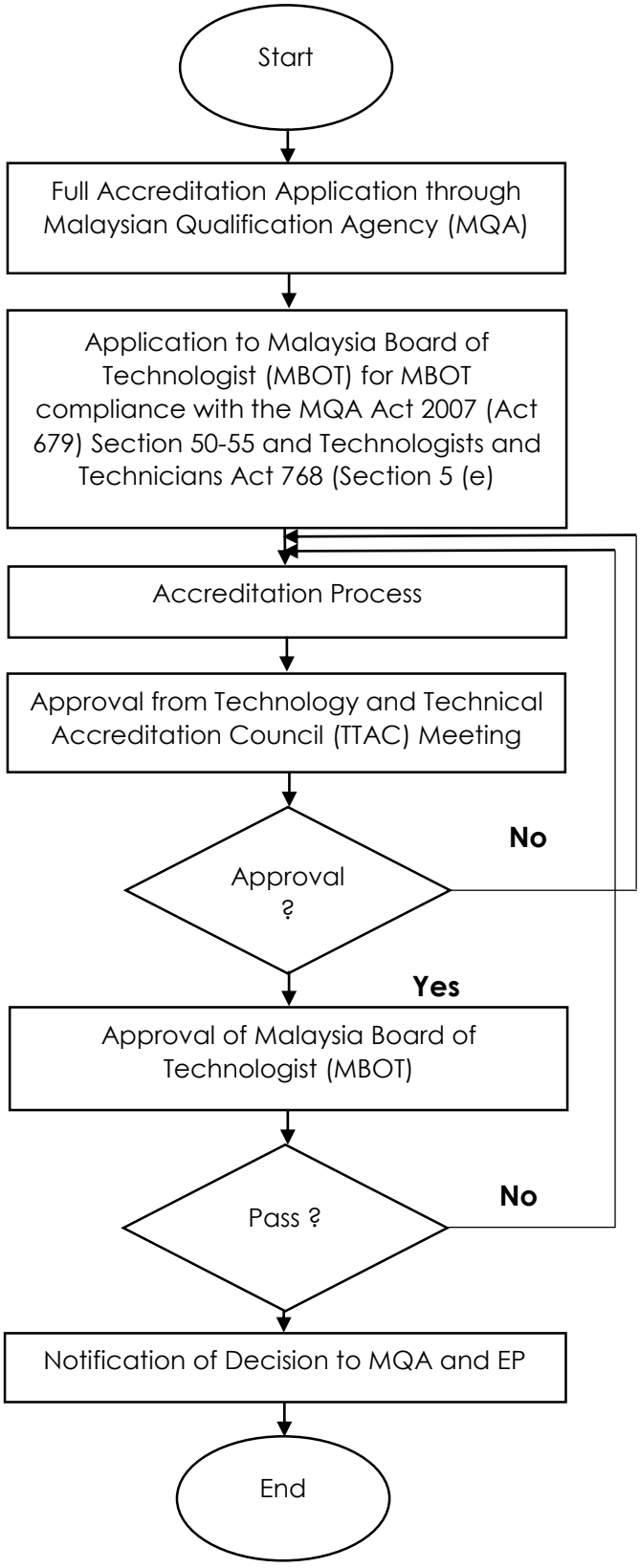
Appendix C

PROVISIONAL ACCREDITATION PROCESS



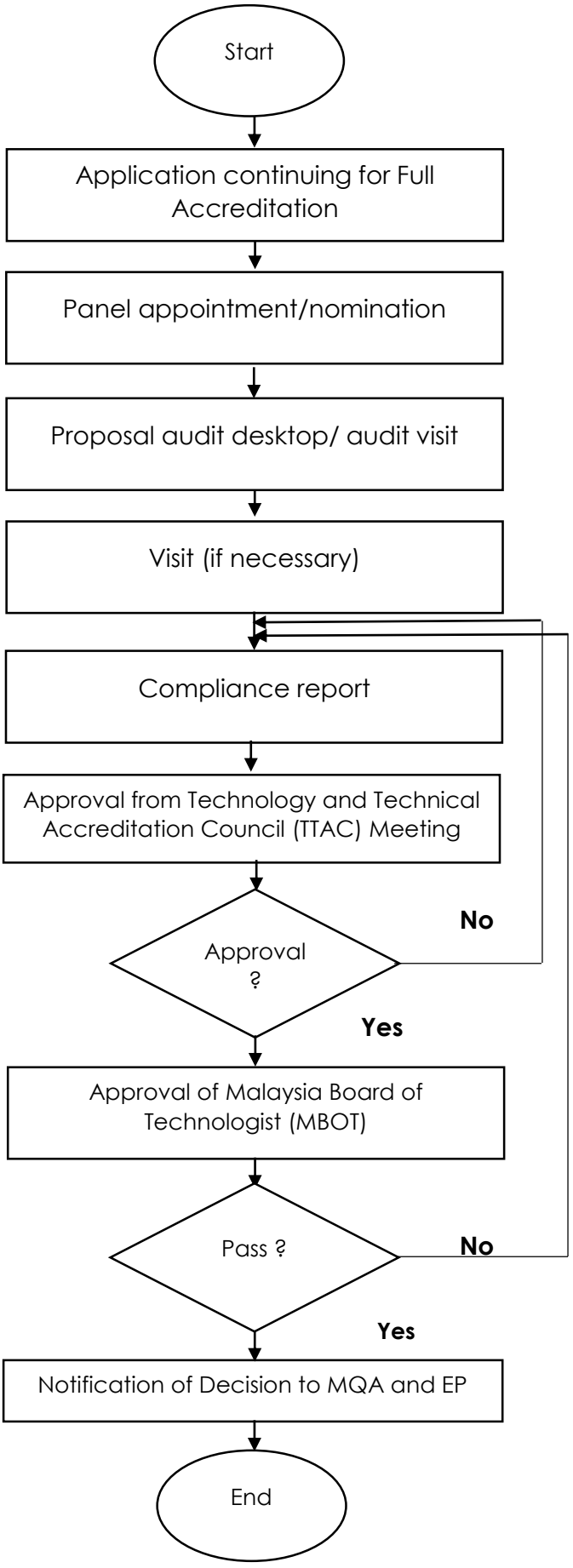
Appendix D

FULL ACCREDITATION PROCESS



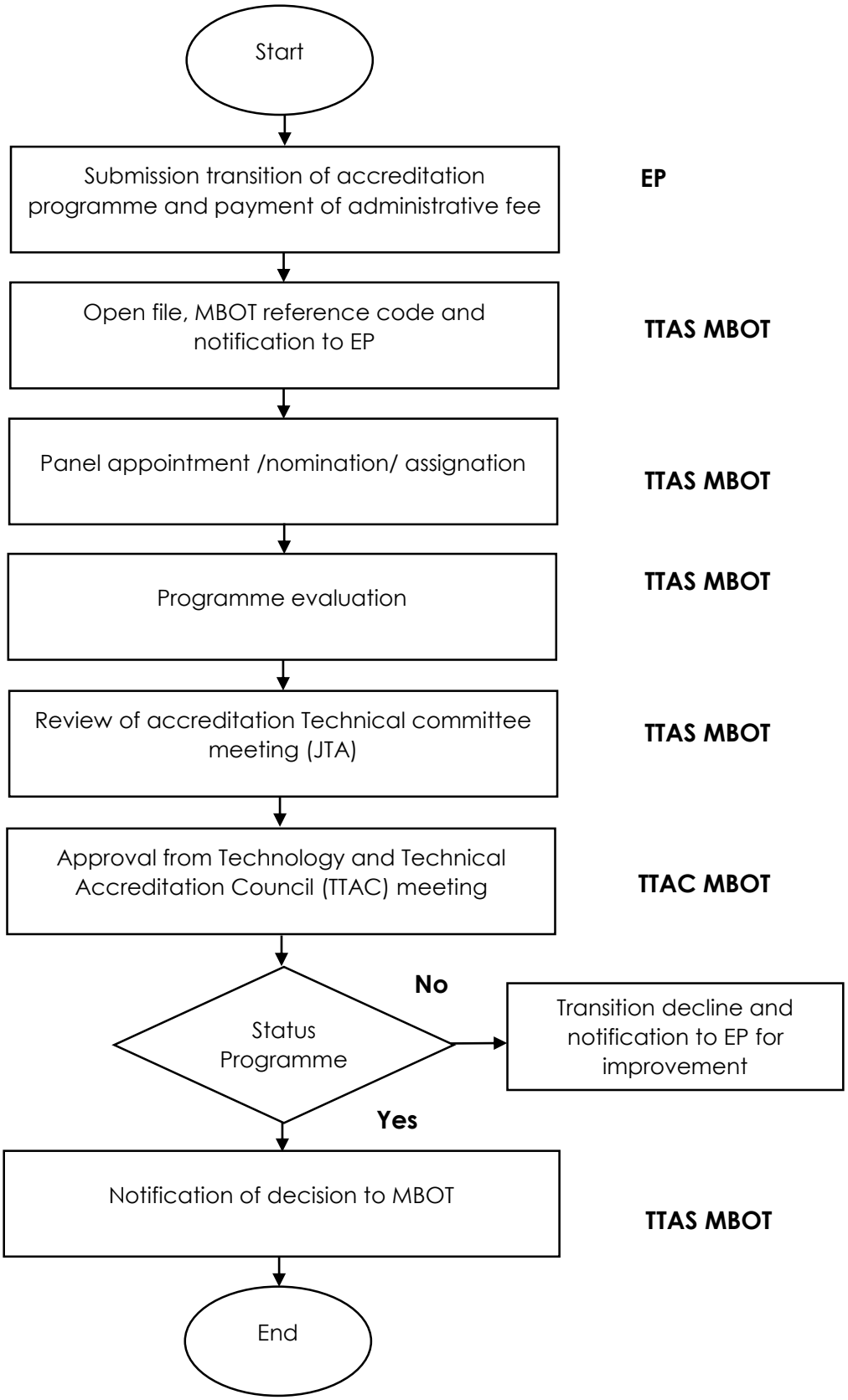
Appendix E

PROCESS OF FULL ACCREDITATION CONTINUING APPLICATION



Appendix F

PROCESS OF TRANSITION OF ACCREDITATION PROGRAMME TO MALAYSIA BOARD OF TECHNOLOGISTS (MBOT)



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