LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

PROFESSIONAL SERVICES STANDARD FOR TECHNOLOGISTS AND TECHNICIANS

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MALAYSIA BOARD OF TECHNOLOGISTS

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“Empowering Professionals, Elevating Standards, Driving Innovation”

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Message from the President

Prof. Emerita Datuk Ts. Ir. Dr. Siti Hamisah binti Tapsir, FASc.
PRESIDENT MALAYSIA BOARD OF TECHNOLOGISTS

The establishment of the Malaysia Board of Technologists (MBOT) under the Technologists and Technicians Act 2015 (Act 768) highlights its critical role in the development of technology and technical talent in Malaysia. By defining and overseeing technical and technological services such as product development, manufacturing, testing, commissioning and maintenance, MBOT serves as the key organisation responsible for fostering a skilled workforce and advancing Malaysia's technological capabilities. This ensures the nation stays competitive in an increasingly innovation-driven global landscape.

The Professional Services Standard for Technologists and Technicians serve as a reference for propelling Malaysia to the forefront of the national technological landscape. This standard is aligned with the Technologists and Technicians Act 2015 (Act 768), ensuring consistency with our national legislative framework. The primary reason for developing this standard is to establish a clear and structured path for practitioners, delineating the boundaries between technology fields while facilitating the government in formulating effective policies. It underscores MBOT's commitment to nurturing a professional, competent and adaptable workforce ready to meet the evolving needs of our industries.

This document is an important reference for Professional Technologists (Ts.) and Certified Technicians (Tc.), alongside organisations, project owners and regulators who depend on professionalism and technical expertise. By providing clear, consistent standards across all 24 recognised fields of technology, the standard aims to ensure that practitioners in technology and technical fields uphold the highest levels of competence, ethics and responsibility. By fostering continuous professional growth, we ensure that our technologists and technicians remain at the forefront of their fields, consistently meeting industrial demands and staying ahead of global advancements.

The development of this standard is rooted in inclusivity, collaboration and technological advancement. Contributions from experts, industry organisations and practitioners across diverse technology fields have made it both practical and relevant. Additionally, the standard incorporates emerging technologies, ensuring that the practices of our members are future-proof and responsive to the dynamic technological landscape.

In closing, I wish to extend my heartfelt appreciation to all the experts, stakeholders, regulators, government representatives and MBOT members who contributed to this monumental effort. Your insights and dedication have been invaluable. I urge every technologist, technician and related professional to embrace this document and make it an integral part of their professional toolkit. Together, we can continue building a trusted and robust framework for technical and technological expertise in Malaysia, driving innovation, ensuring safety and achieving excellence as we advance our nation's capabilities into the future.

Thank you.

Abbreviation

AACV	Autonomous, Automated & Connected Vehicles
AMR	Approve Manufacturing Route
AWS	Automatic Weather System
CAD	Computer- Aided Design
CAMO	Continuing Airworthiness Management Organisation
CCP	Critical Control Point
FAI	First Article Inspection
FAT	Factory/Field acceptance test
FPQ	First Part Qualification
GHG	Greenhouse gas
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPC	Global Protocol for Community
IPCC	Intergovernmental Panel on Climate Change
MBOT	Malaysia Board of Technologist
NFMS	National Forest Monitoring System
NPI	New Product Introduction
NWP	Numerical Weather Prediction
OEM	Original Equipment Manufacturer
PQP	Project Quality Plan
REDD+	Reducing Emissions from Deforestation and Forest Degradation
ROI	Return of investment
SOP	Standards Operating Procedures
Tc.	Certified Technician
Ts.	Professional Technologist
TSS	Traffic Separation Scheme
UAT	User acceptance test
VTS	Vessel Traffic Services

Introduction

In professional technology and technical work, the distinction and regulation of services provided by Professional Technologists and Certified Technicians are essential for maintaining industry standards and ensuring quality assurance. Aligned with Act 768, this standard defines **"technical services"** as specifically product testing, product commissioning and product maintenance, while **"technology services"** extend further to include operations such as product development and product manufacturing. The Board regulates and classifies these services to define the responsibilities associated with each role.

A Professional Technologist, identified by the title "Ts." or "P.Tech.," is entrusted with approving and certifying the manner or conduct of technology services to be carried out. Similarly, a Certified Technician, designated by the title "Tc." or "C.Tech.," is entitled to approve and certify the manner or conduct of technical services to be carried out.

The use of titles, symbols and stamps by both Technologists and Technicians underscores the importance of adhering to professional standard established by the Board. These identifiers not only represent the qualification and specialisation of each individual but also uphold the integrity and consistency of technical practices across the industry. The prescribed use of stamps signifies the official endorsement and accountability of work performed, emphasising the importance of following established standard in maintaining public trust, safety and industry standards.

Objectives of the Professional Services Standard for **Technologists and Technicians**

For MBOT Professional Members 01

To guide Professional Technologists (Ts.) and Certified Technicians (Tc.) in conducting verification and evaluation of technology and technical processes. This ensures that the verification processes are systematic and adhere to established standards.

"Setting standards, ensuring excellence"

For Organisations/ Employers/Project Owners 02

To assist organisations in identifying components or areas within projects and operations that can be certified, ensuring compliance with recognised technical standards. This includes identifying roles in technology and technical functions that require accreditation to enhance quality and safety in their operations.

"Certifying quality, elevating safety"

For Government/Regulators 03

To serve as a reference in developing policies related to technical and technological work, ensuring that policies align with current industry developments and meet technical requirements. This supports the advancement of professionalism within the technology and technical sectors.

"Policy guidance for a progressive industry"

For MBOT 04

To be used as a foundational document in the registration, evaluation and accreditation processes for members involved in technical and technological fields. This standard will help MBOT ensure that qualified members meet the competency standards and professional ethics required.

"Building a framework for professionalism"

Approach to Establishing the Professional Services Standard

Inclusive Perspective

This standard encompasses all 24 recognised fields of technology, ensuring a comprehensive approach to the diverse areas within the profession. It integrates input from experts and various organisations within each field, allowing for a balanced and inclusive perspective that acknowledges the unique standards, practices and challenges of each technology domain.

Advisory and Input by Experts

The standard is developed with comprehensive insights and recommendations from subject-matter experts across various technology and technical sectors. Their active involvement ensures the standard is current, relevant and aligned with best practices, reflecting the latest advancements, challenges and practical knowledge in each field, thereby providing credibility and confidence in the outlined processes and standards.

Complementing the Act and Regulation

The standard is developed with careful reference to existing acts, as well as other relevant regulations and standards applicable to technical and technological practices. It is essential that this standard be used in conjunction with the Technologists and Technicians Act 2015 [Act 768] to ensure alignment with legal requirements and compliance expectations, thereby supporting ethical and regulatory integrity in the professional field.

Embracing Emerging Technology

Recognising the rapid evolution of technology, this standard factors in emerging technologies and industry trends. This approach ensures the standard remains relevant and forward-looking, preparing technologists and technicians to navigate new developments effectively.

Benchmarking

Benchmarking compares and analyses similar guidelines, standards and practices across industries. The standard aims to maintain high standards, identify best practices and address gaps in existing frameworks by reviewing and synthesising findings from established benchmarks.

PROFESSIONAL SERVICES STANDARD FOR 24 FIELDS OF TECHNOLOGY

According to the Technologists and Technicians Act 2015 [Act 768]

Professional Technologists (Ts.)

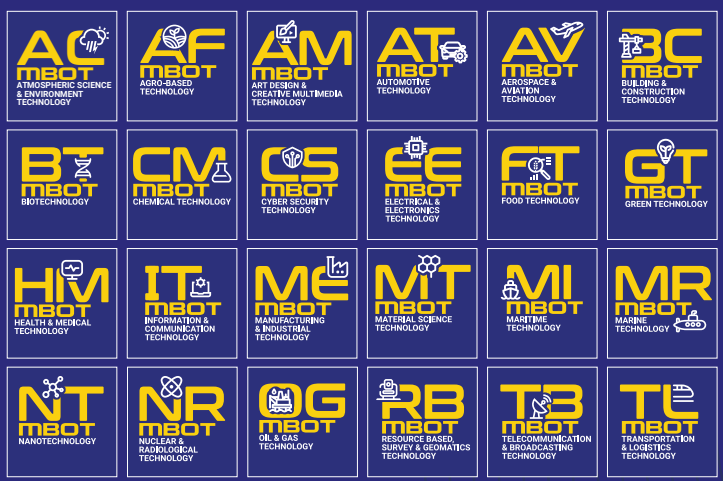
Technology services in respect of any operation relating to product:

DEVELOPMENT | MANUFACTURING | TESTING | COMMISSIONING | MAINTENANCE

Certified Technicians (Tc.)

Technical services in respect of any operation relating to product:

TESTING | COMMISSIONING | MAINTENANCE



Atmospheric Science & Environmental Technology (AC)

Definition

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

Related Key Areas

1. Meteorology
2. Climate Change
3. Environmental Technologies
4. Ecology
5. Geophysics and Disaster
6. Hydrology

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Design of pollution control systems and monitoring systems/ equipment to comply with requirements/ standards/ industry best practices
ii. Weather monitoring data and monitoring systems based on global and Malaysia monitoring standard
iii. Greenhouse gas emissions (direct emissions) based on global standard and greenhouse gas (GHG) emission accounting for city-wide based emission according to global protocol for community (GPC)
iv. Forestry data provided according to the national forest monitoring system (NFMS) to meet global standards for reducing emissions from deforestation and forest degradation (REDD+) and support net zero goals
v. Planning and monitoring systems for hydrology, geophysics, disaster monitoring, environmental pollution control and environmental system, to ensure the alignment with global and Malaysian standards, including the manual and seismic hazard assessment guidelines

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Installation of pollution control systems and monitoring systems/ equipment to comply with standards/ industry best practices

ii. Weather forecasting or weather monitoring systems installation process to comply with Malaysia's guideline and global standards
iii. GHG emissions data from product manufacturing to comply with global standards such as intergovernmental panel on climate change (IPCC)
iv. Forestry baseline data and its progressive according to the NFMS and the global standard and support net zero
v. Installation of hydrology, geophysics disaster mitigation and monitoring systems based on Malaysian systematic geological mapping or seismic hazard assessment and global standard

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Field acceptance test (FAT) and user acceptance test (UAT) of pollution control systems and monitoring systems/equipment to ensure its functionality
ii. Numerical weather prediction (NWP) and FAT and UAT for weather monitoring systems/equipment to ensure its functionality
iii. GHG emission/environmental pollution control systems/ environmental monitoring systems data for validation and verification by standards to ensure it meets global standards and supports net zero goals
iv. The forestry data according to NFMS to fulfill the global standard REDD+ and support net zero
v. FAT and UAT of hydrology, geophysics, disaster monitoring data and mitigation systems based on global and Malaysian monitoring standard

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Quality assurance and quality control procedures developed by a technical person for the commissioning of pollution control systems and monitoring systems/equipment to achieve intended quality and specification
ii. Quality control procedures for weather monitoring/forecasting equipment/ system to achieve the required standard during installation
iii. GHG emission equipment monitoring system to ensure its readiness for operation
iv. Inspection of forestry data according to NFMS and the global standard REDD+ and support net zero
v. Quality control procedures developed for hydrology, geophysics, disaster monitoring and mitigation systems based on global and Malaysia monitoring standard

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Scheduled maintenance work done by the technical personnel for pollution control systems and monitoring systems or equipment in ensuring its sustainability until the next maintenance cycle
ii. Scheduled maintenance work on the automatic weather system (AWS), in ensuring its sustainability until the next maintenance cycle
iii. Scheduled maintenance work done by technical personnel on GHG equipment monitoring system and data for GHG emission in ensuring its sustainability until the next maintenance cycle
iv. Scheduled maintenance work for forestry data according to NFMS and the global standard REDD+ and support net zero
v. Scheduled maintenance work done by technical personnel for hydrology, geophysics, disaster monitoring and mitigation systems in ensuring its sustainability until the next maintenance cycle

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Performance of quality control procedure for each function of pollution control systems unit processes and monitoring systems/equipment to ensure its functionality and to comply with industry-standard and/or guideline
ii. NWP, FAT and UAT for weather monitoring systems/equipment to ensure its functionality and to comply with industry-standard and/or guideline
iii. GHG emission data validation and verification according to industrial/ global/ regulatory standards to ensure it fulfils the global standard and supports net zero
iv. Forestry data recording according to NFMS to fulfil the global standard REDD+ and support net zero
v. The FAT and UAT of hydrology, geophysics, disaster monitoring data and mitigation systems based on global and Malaysia monitoring standard

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Quality assurance and quality control procedures for the commissioning of pollution control systems and monitoring systems/equipment to achieve intended quality and specification
ii. The quality control procedures for weather monitoring or forecasting equipment or system to ensure it achieved the required standard during installation
iii. Installation and testing of the greenhouse gas emission equipment monitoring system to ensure its readiness for operation
iv. Forestry data according to NFMS and the global standard REDD+ and support net zero
v. Quality control procedures developed for hydrology, geophysics, disaster monitoring and mitigation systems based on global and Malaysian monitoring standard

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Scheduled maintenance work conducted for pollution control systems and monitoring systems/ equipment to ensure its sustainability until the next maintenance cycle
ii. The scheduled maintenance work on the AWS, in ensuring its sustainability until the next maintenance cycle
iii. Scheduled maintenance work conducted on the GHG equipment monitoring system and data for ghg emissions to ensure its sustainability until the next maintenance cycle
iv. Schedule maintenance work for forestry data according to NFMS and the global standard REDD+ and support net zero
v. Scheduled maintenance work conducted for hydrology, geophysics, disaster monitoring and mitigation systems to ensure its sustainability until the next maintenance cycle

REFERENCES:

- Environmental Quality Act 1974 [Act 127]
- Environmental Quality (Industrial Effluent) Regulations 2009
- ISO 14064 - International Standard for GHG Emissions Inventories and Verification
- Technical Note No. 4/2022- Improving WRF-MMD's Precipitation Forecasts Consistency using Time- Lagged Ensemble Method, Malaysian Meteorological Department

Agro-based Technology (AF)

Definition

Agro-based Technology (AF) is an application of technology which involves in production, services and postharvest handling related to agriculture.

Related Key Areas

1. **Agriculture Ecosystem and Services**
   Land and water management, environmental science, agriculture waste management, agriculture engineering and mechanisation, smart farming and automation, agriculture economics, forestry

2. **Crop Science**
   Crop physiology, agronomy, agriculture microbiology, agriculture biotechnology, plant breeding, horticulture, seed science, soil science, plant pathology, plant protection, entomology, plantation and commodity, post-harvest handling, agriculture chemistry

3. **Animal Science**
   Veterinary, aquaculture, animal husbandry, apiculture

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Safety of resources used which comply with agro-based industry standard
ii. Materials that are compatible with agro-based environments, considering factors like durability, sustainability and cost
iii. Development of the procedure/ roadmap/ policies in ensuring the development of the products is smooth sailing and following standards and regulation

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Inspection of the agro-based production resources to comply with standards and regulation
ii. Inspection of the steps involved in agro-based production, including lead times, material sourcing and quality control procedures
iii. Inspection agro-based procedure/ roadmap/ policy guideline to comply with standards and regulation needs

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Implementation measures to monitor and maintain quality throughout the agro-based production process including testing raw materials, finished products and random inspections
ii. Testing and/or inspection in agro-based products meet specified requirements and standards
iii. Research and/or implementation of the new agro-based testing technologies to improve testing processes and accuracy

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Safety of the agro-based product to comply with standard and regulation
ii. Coordination with project managers, contractors and other stakeholders to ensure a smooth commissioning process

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Establishment of the sustainable agro-based production cycle
ii. Development of the regular agro-based maintenance schedule for equipment, considering manufacturer recommendations and the frequency of use
iii. Agro-based scheduled maintenance work done by technical personnel in ensuring circular production sustainability until the next maintenance cycle
iv. Agro-based personnel operating and maintaining equipment are adequately trained on proper procedures and safety protocols

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Production process conducted in agro-based including testing raw materials, finished products and random inspections
ii. Execution of test and inspection on agro-based products to meet specified requirements and standards
iii. Execution for new testing technologies in agro-based to improve testing processes and accuracy

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Testing the safety of the agro-based product to comply with standard and regulation
ii. Execution for the commissioning agro-based procedures and protocols
iii. Documentation of commissioning agro-based activities and preparing comprehensive reports

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Agro-based maintenance records, including dates, tasks performed and parts replaced
ii. Performance of a regular agro-based maintenance schedule for equipment, considering manufacturer recommendations and the frequency of use
iii. execution of the agro-based scheduled maintenance work done by technical personnel to ensure circular production sustainability until the next maintenance cycle

REFERENCES

- Control of Padi and Rice Act [Act 522]
- ISO 45001 - Occupational Health & Safety
- ISO/TS22002-3 - Prerequisite Programmes on Food Safety -Part 3: Farming
- ISO/TS22002-6 - Prerequisite Programmes on Food Safety -Part 6: Feed and Animal Food Production
- ISO22000 - Food Safety Management Systems –Requirements for Any Organization in The Food Chain
- ISO22005 - Traceability in The Feed and Food Chain – General Principles and Basic Requirements for System Design and Implementation
- Malaysia Good Agricultural Practices (MyGAP)
- Malaysia Quarantine and Inspection Services Act [Act 728]
- Pesticides Act [Act 149]
- Plant Quarantine Act [Act 167]
- Protection of New Plant Varieties Act [Act 634]

Art Design & Creative Multimedia (AM)

Definition

Art Design and Creative Multimedia (AM) involves the process, technique and application of technology to produce creative output.

Related Key Areas

1. Creative Multimedia
2. Art and Design
3. Entertainment
4. Games Development

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Analysis of project brief to ensure it meets project specifications and standards
ii. Facilitation of project implementation and requirements within the scope of work
iii. Formulation of a product or service ideation into a concept based on specification

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Performance of the product against product specification
ii. Properties/production of performance assessment of the product based on product specification

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Development of production evaluation set criteria based on good practices
ii. Production quality monitoring of the product based on requirements
iii. Product quality evaluation based on product brief

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Determine the functional requirement based on project requirements
ii. Execution of the functional product according to standards and requirements
iii. Ensure the product is functional based on set requirements

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Outline product quality criteria based on standard requirements
ii. Execution of the best product quality based on standards and requirements
iii. Ensure the product quality meets standards and requirements

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Production process execution based on good practices
ii. Standard operating procedures of the product quality
iii. Production progress report based on stages of production

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Compliance with functional requirements based on project requirements
ii. Assistance in producing functional products according to standards and requirements
iii. Ensure product execution based on the set requirement

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Ensure product quality meets standards and requirements
ii. Adhere the feedback to meet expected standards and requirements
iii. Ensure error amendment/ corrective action meet expected standards and requirements

REFERENCES:

- Communications and Multimedia Act [Act 588]
- Intellectual Property Corporation of Malaysia Act [Act 617]
- Malaysian Code of Ethics for Journalists
- Packaging & Security Design – SIRIM
- Perbadanan Kemajuan Filem Nasional Malaysia Act [Act 244]
- Perintah Fi (FUTEJ) 1999 [P.U. (A) 215/1999]

Automotive Technology (AT)

Definition

Automotive Technology (AT) is an application, method and process which involve design, development, manufacturing, maintenance and servicing in automotive industry.

Related Key Areas

1. Automotive Manufacturing
   Autonomous, Automated and Connected Vehicles (AACV), ICT Management
2. Powertrain
   Crashworthiness, Roadworthiness
3. Technical/Technology Design
4. Mechanic Automotive

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Verification of solutions /process / procedure design of the technical requirements and related standards
ii. Endorsement and verification of product development proposals based on requirement

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. FAT based on technical specifications
ii. Inspection/verification of the technical installation based on requirements/ standards/ industry best practice

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Testing procedures review of proposed designs based on technical requirements and relevant standards
ii. Testing procedures endorsement for the validation of proposed designs based on technical requirements and relevant standards
iii. Endorse test based on approved test procedures and design
iv. Verification of the product operating parameters to comply with regulatory requirements

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Design/ installation/ test/ operation/ maintenance of the product according to the manufacturer/ operational requirements/ authority requirements

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Validation of the maintenance Standards Operating Procedures (SOP) based on manufacturer's specification/manual /working methods/related documents
ii. Fault incident reports according to complaint and troubleshooting methodology within the agreed scope of works
iii. Analysis and monitoring of the product and system performance parameters
iv. Measurements of improvement areas based on the acceptance or relevant standard/ procedure/ act

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify/ approve technical services in respect of any operation relating to:

i. execution of test procedure and result verification according to the relevant standard

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Product or material according to the design/ comply with the standards and technical requirement
ii. Installation of the equipment and execution of acceptance test based on procedures

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Scheduled maintenance activities for optimum working conditions according to maintenance checklist/ SOP/manuals
ii. Condition-based maintenance and producing incident reports according to complaint and troubleshooting methodology

REFERENCES

- MS 2696:2018 - Motor Vehicle Aftermarket Service and Spare Part
- MS 2697:2018 - Motor Vehicle Aftermarket Repair
- UN Regulation No 100 - Uniform Provisions Concerning the Approval of Vehicles with regard to Specific Requirements for the Electric Power Train
- UN Regulation NO 13-H - Uniform Provisions Concerning the Approval of Passenger Cars with regard to Braking
- UN Regulation NO 94 - Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants in the Event of a Frontal Collision
- ISO 26262 - Road Vehicles – Functional Safety
- ISO/TS 16949 - Quality Management Systems for Automotive Production

Aerospace & Aviation Technology (AV)

Definition

Aerospace & Aviation Technology (AV) covers the industrial activities related to the design, development, manufacture, construction, operation, maintenance and disposal of aircraft, spacecraft, missiles, rockets and its supporting functions.

Related Key Areas

1. Engineering and Design
2. Aerospace Manufacturing
3. Systems Integration
4. Maintenance, Repair and Overhaul
5. Continuing Airworthiness Management Organisation (CAMO)
6. Aerospace Support Services

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Product design, change dan modification and New Product Introduction (NPI) to comply with Original Equipment Manufacturer (OEM) and/or regulatory standards
ii. New process of development and configuration to comply with OEM and/or regulatory standards
iii. Tools, jigs and fixtures development and modification to comply with OEM and/or regulatory standards
iv. Identification, assessment and risk mitigation related to products and processes to comply with OEM and/ or regulatory standards

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Approve Manufacturing Route (AMR) to comply with OEM and/or regulatory standards
ii. First Part Qualification (FPQ) to comply with OEM and/or regulatory standards
iii. First Article Inspection (FAI) to comply with OEM and/or regulatory standards
iv. Process Qualification to comply with OEM and/or regulatory standards

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Establishment of the equipment/ component/ tooling/ system for serviceability to ensure safety/ security/ reliability compliance with regulatory and/or OEM requirements before deployed for operational use
ii. Structural integrity/ performance/ functionality of the system determination under various conditions as per regulatory/ requirement
iii. Potential issues/ defect identification that could compromise the safety/ efficiency of the product/ process following regulatory/ OEM requirement

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. functionality, safety and compliance with OEM and/or regulatory standards of equipment/ component/ tooling/ system/ facility
ii. calibration of the equipment/ component/ tooling/ system to meet the OEM and/or regulatory standards
iii. compliance of process flow following the OEM and/or regulatory standards

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. inspection/ repair/ replacement/ modification/ overhaul of the equipment/ component/ tooling/ system follows OEM and/or regulatory standards
ii. prevention/ prediction maintenance of equipment/ component/ tooling/ system is following OEM/ regulatory standards
iii. facility and supporting equipment to comply with OEM requirements and/ or regulatory standards.
iv. continuous improvements of equipment/ components/ tooling/ system/ process flow to comply with OEM requirements and/or regulatory standards

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution of inspection as per OEM requirement and/or regulatory standards

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Execution of required approved work as per OEM requirement and/or regulatory standards

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Execution of approved maintenance activities in accordance with OEM requirements and/or regulatory standards

REFERENCES

- AS13000 - Problem Solving Requirements for Suppliers
- AS9100 - Aerospace Quality Standard
- AS9145 -Aerospace Standard: Advanced Product Quality Planning (APQP) & Production Part Approval Process (PPAP)
- ISO17025 - Laboratory Testing
- National Aerospace and Defence Contractors Accreditation Program (NADCAP)

Building & Construction Technology (BC)

Definition

Building & Construction Technology (BC) refers to technical processes, methods, materials, advanced technologies and innovative solutions used in the building and construction industry to satisfy and enhance efficiency and safety, satisfy functionality and performance, improve project sustainability and adopt more cost-effective procedures.

Related Key Areas

1. Infra Works
2. Building Works
3. Architecture
4. Property and Facilities Management
5. Contract Management
6. Road & Bridge

BC MBOT BUILDING & CONSTRUCTION TECHNOLOGY

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Quality management using technology application
ii. Input in technical & technology aspects in feasibility study/ specification/ contract
iii. Expert supports for digital applications/ green building design
iv. Research and development of technology related to building and construction
v. Hazards and risks assessment in relation to technological application

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Stakeholders' coordination of Project Quality Plan (PQP) finalisation for management plan
ii. Expert supports for digital implementation
iii. Environmental, safety and health plan

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Product verification for projects
ii. Supporting documents verification on product performance
iii. Suitability of the technology used for testing in different environments

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Support decision making by contract administrator in matters related to technology application and implementation
ii. Recommendation of appropriate technology application for contract administration
iii. Deficiency lists and potential solutions during commissioning

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Calibration and testing method statement for maintenance
ii. Deficiency lists and solutions during maintenance
iii. Operations maintenance, preventive maintenance, corrective maintenance and de-commissioning

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Product testing monitoring for projects
ii. Supporting documents preparation on product performances
iii. Suitability of the technology used for testing in different environments

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Application of technology for contract administration
ii. Deficiency lists and potential solutions during the commissioning

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Calibration and testing monitoring for maintenance
ii. Deficiency lists and potential solutions preparation during maintenance
iii. Operations maintenance, preventive maintenance, corrective maintenance and de-commissioning support

REFERENCES

- Environmental Management Plan (EMP)
- ISO 14001 EMS - Environmental Management Systems
- ISO 17025 - Accredited Test Lab
- ISO 17025 - Testing and Calibration Laboratories
- ISO 18001 OHSAS - Occupational Health & Safety
- ISO 19650-1:2018 Organization and Digitization of Information About Buildings and Civil Engineering Works, Including Building Information Modelling (BIM)
- ISO 24359-1 Building Commissioning Process Planning
- ISO 27001 - Information Security
- ISO 55001 - Asset Management-Management Systems
- ISO 9001 QMS - Quality Management System
- MS 1472: 1999 - Code of Practice for Fire Precautions in The Design of Buildings - Smoke Control in Protected Escape Routes Using Pressurisation
- MS 26-1-3: 2009 - Testing of Concrete - Part 1: Fresh Concrete - Section 2: Slump Test (Second Revision)
- MS 426:1994 - Code of Practice for Safety and Health at Work

Biotechnology (BT)

Definition

Biotechnology (BT) is the use of the living system or any of its elements to develop, modify or make products for healthcare, agriculture and/or industry

Related Key Areas

1. **Agriculture Biotechnology**
   Crop biotechnology, natural product biotechnology, livestock biotechnology, aquaculture, marine biotechnology
2. **Industrial Biotechnology**
   Biochemical, bioenergy, biomaterials, biocatalyst, bioremediation
3. **Healthcare Biotechnology**
   Contract research organisation, contract research and manufacturing services, biopharmaceuticals, biosensors, in-vitro diagnostic, stem cell, cellular medicine, cellular and gene therapy products, bio-cosmeceuticals

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Development of biotechnology products/processes/methods to ensure accuracy together with reliability
ii. Optimisation of product/ methods processes development and validation, adhering to established protocols and standards

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Establishment of SOP for biotechnology product/ process/ methods, ensuring consistency and reproducibility of the programs
ii. Biotechnology manufacturing process reporting to stakeholders for monitoring and product compliance
iii. Inspection of biotechnology product manufacturing to identify defective product/ non-conforming product/ system failures, adhering to established protocols and standards

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Establishment of testing SOP for biotechnology product/ process/ methods ensuring consistency and reproducibility
ii. Quality control procedures for precision and consistency of biotechnology product/processes/ methods/ programs, adhering to established protocols and standards
iii. Identification of areas for improvement by utilising data-driven insights for biotechnology product/ process/ methods programs to assess their efficacy
iv. Calibration of biotechnology instruments to improve consistency in data measurement accuracies and compliances

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Training program on the implementation and utilisation of biotechnology products/processes/methods/ programs adhering to the protocols, ensuring proficiency and competency
ii. Quality control procedures for each critical control point (CCP) of the biotechnology product/process/ methods programs using designated tools and following standard operating procedures
iii. Biotechnology equipment/ systems/ processes to ensure successful and proper functioning adhering to the protocols and standards
iv. Biotechnology equipment setup/ calibration using specialised tools and instruments

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Biotechnology product/ process/ methods problems troubleshooting to ensure product maintenance runs smoothly
ii. Biotechnology product/process/ methods equipment monitoring are fit to use to prevent manufacturing problems
iii. Biotechnology product/ process/ methods/programs update to incorporate latest methodologies/ approach/ instruments into biotechnology development projects
iv. Findings and recommendations to stakeholders through reports, facilitating informed decision-making processes

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Product testing for biotechnology products/processes/methods adhering to established protocols and standards
ii. Reinforcement in quality control procedures on biotechnology product/ process/methods programs, adhering to established protocols and standards
iii. Production of data for evaluation of biotechnology product/ process/ methods programs to assess their efficacy and identify areas for improvement
iv. Calibration of biotechnology instruments to improve consistency in data measurement accuracies and compliances

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Technical staff training on the implementation and utilisation of biotechnology product/ process/ methods programs to achieve proficiency and competency requirements
ii. Quality control support for each CCP of the biotechnology product/ process/ methods programs, following standard operating procedures
iii. Biotechnology equipment/ systems/ processes adhering to protocols and standards
iv. Biotechnology equipment setup and calibration support using specialised tools and instruments

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Troubleshooting support activities under the supervision of maintenance personnel by following safety protocols and guidelines
ii. Commissioning of biotechnology product/ process/ methods equipment to prevent manufacturing problems and adhering to instrument protocols
iii. Maintenance tasks on biotechnology product/ process/ methods equipment and machinery to ensure optimal performance by utilising maintenance tools and procedures
iv. Environmental and hygienic monitoring conditions for reliable manufacturing processes based on standard safety and health plans

REFERENCES

- Animal Ethics
- Good Agricultural Practices (GAP)
- Good Laboratory Practice (GLP)
- Good Manufacturing Practices (GMP)
- Halal Standards
- IEC 17025 - Testing and Calibration Laboratories

Chemical Technology (CM)

Definition

Chemical Technology (CM) is the utilisation of technology in the development, modification, production or commercialisation of an organic or inorganic chemical substance.

Related Key Areas

1. Product
2. Process
3. Product Services
4. Commercial Technical Services

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Development of a new product portfolio to comply with customer requirements, applicable standards and regulations
ii. Integration of the new technology for product development and increased efficiency

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Establishment of the operation, shutdown and start-up procedure according to SOP and regulation
ii. Compliance of the operation, shutdown and start-up procedure according to SOP and regulation
iii. Current process according to operation according to SOP and regulation
iv. Troubleshooting the process to normalise the process condition according to SOP and regulation

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Establishment of the new product procedure according to customer requirements, applicable standards and regulations
ii. Quality of the raw material in process and product according to standard specification
iii. Result analysis according to standard specification

iv. Integration of the new product performance according to customer validation
v. Instrument/measuring device performance according to standard specification

Product Commissioning
Certify /approve technology services in respect of any operation relating to:
i. Development for commissioning procedure according to standard specification
ii. Equipment performance according to equipment design specification
iii. Performance test result according to standard specification

Product Maintenance
Certify /approve technology services in respect of any operation relating to:
i. Establishment of maintenance activities according to the standard and regulation
ii. Maintenance activities output according to the standard and regulation
iii. Calibration report according to the standard and regulation

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:
i. Quality testing of the raw material in process and product according to standard specification
ii. Accurate data production according to standard specification

Product Commissioning
Certify /approve technical services in respect of any operation relating to:
i. Commissioning activity according to the commissioning procedure
ii. Evaluation of the analyst or analytical technician's performance according to standard requirement

Product Maintenance
Certify /approve technical services in respect of any operation relating to:
i. Maintenance of programs according to standard operation procedure
ii. Calibration/ alignment/ tuning activity according to the standard operation procedure

REFERENCES:
- Environmental Quality Act 1974 [Act 127]
- Factories and Machinery Act 1967 [Act 139]
- Occupational Safety and Health Act 1994 [Act 514]
- QMS ISO 9001- Quality Management Standard

Cybersecurity Technology (CS)

Definition

Cybersecurity Technology (CS) is an applied body of knowledge in the process, practice, design and technique to protect information, data and networks in preserving confidentiality, integrity and availability.

Related Key Areas

1. Information Assurance
2. Network Security
3. Data Security
4. Societal and Organisational Security

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Plan/design/ developing info security solutions while adhering to a standard methodology, to meet defined security objectives, requirements and standards

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Implementation of security solutions following a specified design and methodology to meet requirements and specifications

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Assessment, evaluation or/and validation of the security solution according to specifications, following a standard testing methodology and/ or industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Assure all security solutions and components are designed, integrated, installed and/or configured following the requirements and guidelines

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Ensure security solution is maintained or improved regularly through the identification and correction of faults and problems, both proactively and reactively

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Ensure the process/method of security solution functions according to requirements, following a standard testing methodology and/or industry best practice

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Assure all security solutions and components of a system are designed, installed and configured in accordance with the requirements

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Ensure security solution is maintained or improved regularly through the identification and correction of faults and problems, both proactively and reactively

REFERENCES

- $(ISC)^2$ Cybersecurity Workforce Framework
- Global ACE Certification
- ISO 22301 -Business Continuity Management
- ISO 9001 - Quality Management Standard
- ISO/IEC 15408 - Common Criteria
- ISO/IEC 17024 - Conformity Assessment
- ISO/IEC 17025 - Testing and Calibration Laboratories
- ISO/IEC 27001 - Information Security Management System
- National Institute of Standards and Technology (NIST) Cybersecurity Framework

Electrical & Electronic Technology (EE)

Definition

Electrical & Electronic Technology (EE) involves the process, technique and application of any electrical and electronics-related works.

Related Key Areas

1. Power - Generation, Transmissions and Distribution
2. Semiconductor
3. Control and Instrumentation
4. Signal Processing

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Development of electrical and electronic technologies to increase the productivity or efficiency of the services or products
ii. Optimise existing design parameters in electrical and electronics processes or systems to suit the specifications and requirements of relevant services according to standards and requirement
iii. Functionality and/or reliability of the developed electrical and electronics processes or systems based on design specifications and requirements, according to industry best practices and standards

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Processes, procedures and methods of operation to achieve continuous improvement in the electrical and electronics technology domain
ii. Quality of product and performance of processes according to the requirement, industry best practices and design standards in the electrical and electronics technology domain
iii. Appropriate electrical and electronics technologies usage in the manufacturing process, equipment and materials to meet user requirements, industrial best practices and standards

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Appropriate technologies usage in the test process, equipment and materials to meet user requirements, industrial best practices and standards
ii. Procedures test and work instruction test based on requirements, industry best practices and standards
iii. Test result based on electrical and electronic knowledge

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Installation and acceptance test procedure according to requirements, industry best practices and standards
ii. System parameters, settings and set points to ensure compliance with design specifications and operational requirements

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Appropriate technologies usage in the maintenance process, equipment and materials to meet user requirements, industrial best practices and standards
ii. Maintenance outcomes based on electrical and electronic knowledge

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution/ facilitation/ plan of electrical and electronic test cases and test implementation based on requirements/ standards/ industry best practices
ii. Implementation of electrical and electronic tests to meet the specifications/requirements / standards /industry best practices
iii. Test implementation report based on requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Installation of electrical and electronic systems
ii. Acceptance test procedure according to requirements/ standards/ industry best practices
iii. Test systems for proper operation, functionality and performance

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Maintenance procedures for electrical and electronic systems according to requirements/ standards/ industry best practices
ii. Maintenance report based on requirements following industry best practices and standards
iii. Next course of action based on maintenance outcome to higher management to improve existing processes and procedures

REFERENCES

- Communications and Multimedia Commission Act 1998 [Act 589]
- Electricity Supply Act 1990 [Act 447]
- ISO/IEC 17025 - General Requirements for The Competence of Testing and Calibration Laboratories
- Guideline for Approval of Electrical Equipment, Electricity Regulations 1994 (ER 1994)
- IEC 60335-1:2010 - Household and Similar Electrical Appliances – Safety – Part 1: General Requirements
- MS IEC 61558-1:2005- Safety of Power Transformers, Power Supply Units and Similar – Part 1: General Requirements and Tests
- MS 1578:2003- Specification for Flat Non-Rewirable Two-Pole Plugs, 2.5 A, 250 V with Cord, for The Connection of Class II – Equipment for Household and Similar Purposes

Food Technology (FT)

Definition

Food Technology (FT) is the application of science and technology related to principles and techniques that involve physical, chemical and microbiological aspects in manufacturing, processing, preservation, packaging, distribution, bioprocess and safety for safe food production and human consumption.

Related Key Areas

1. **Food Processing**
   Food manufacturing, food processing, food packaging, food engineering, food preservation, food product development
2. **Food Science**
   Food chemistry & biochemistry, post-harvest technology
3. **Food Quality Assurance**
   Food analysis, food quality assurance, food safety
4. **Food Bioprocess**
   Food microbiology, enzymology

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Idea generation and selection process by applying the principles of "Design Thinking" and other relevant methodologies
ii. Proof of concept by complying with legal and applicable standards
iii. Prototype development to comply with legal and applicable standards
iv. Characteristics of product based on sensory evaluation, packaging, shelf-life analysis and physio-chemical testing
v. Market testing outcome on product acceptance by the consumer
vi. Feasibility study on industrial scale production of the product developed

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Manufacturing operations, including planning, designing and monitoring of the process flow, plant layout and machinery according to legal/ requirements/ standards/ industry best practices
ii. Problem identification of product which affects quality and compliance requirements
iii. Product quality improvement and cost-effectiveness in compliance with legal/ requirements/ standards/ industry best practices

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Sampling plans for product testing according to legal/ requirements/ standards/ industry best practices
ii. Facility readiness for product testing according to legal/ requirements/ standards/ industry best practices
iii. Product testing procedures according to legal/ requirements/ standards/ industry best practices
iv. Testing report according to requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Product labelling specifications in compliance with legal/ requirements/ applicable standards/ industry best practices
ii. Raw material specification, processing parameters, product specification, quality control procedures and quality assurance procedures in compliance with legal/ requirements/ standard operation procedures/ industry best practices
iii. Selection and suitability of packaging specification and design in compliance with legal/ requirements/ standard operating procedures/ applicable standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Control of operation according to legal/ requirements/ standard operating procedures/ applicable standards/ industry best practices
ii. Establishment of SOP for the identified control of operation
iii. Establishment of food safety assurance according to requirements/ acceptable standards/ industry best practices
iv. Management of food safety assurance program based on the established procedures
v. Analysis of food quality and safety performance according to legal requirements/ standards/ industry best practices for continual improvement

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution of the sampling plans for product testing according to legal/ requirements/ standards/ industry best practices
ii. Facility maintenance for product testing according to legal/ requirements/ standards/ industry best practices
iii. Execution of product testing procedure according to legal/ requirements/ standards/ industry best practices
iv. Preparation of testing reports according to legal/ requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Preparing the product labelling in compliance with legal/ requirements/ standards/ industry best practices

ii. Monitoring the raw materials, processes, products produced is within requirements/ standards/ industry best practices
iii. Execution of the quality control and quality assurance parameters in compliance requirements/ standards/ industry best practices
iv. Execution of packaging design testing according to requirements/ standards/ industry best practices

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Execution of the control of operation according to legal/ requirements/ standards/ industry best practices
ii. Perform and monitor the food safety program or management system according to legal/ requirements/ standards/ industry best practices
iii. Food quality and safety report according to legal/ requirements/ standards/ industry best practices

REFERENCES

- Brand Reputation through Compliance (BRC)
- CODEX Alimentarius.
- Food Act 1983 [Act 281] & regulation.
- Food Analyst Act 2011 [Act 727] & regulation
- Food Safety Management System (FSMS)
- FSSC 22000 -Food Safety Standards and Processes
- Laboratory Accreditation Scheme of Malaysia (SAMM)
- MS ISO 17025 -Requirements for Food Testing Laboratories
- MS1480- Food Safety According to Hazard Analysis and Critical Control Point (HACCP)
- MS1500 - Halal Food - Production, Preparation, Handling and Storage - General Guidelines
- MS1514 -Good Manufacturing Practices (GMP) for Food

Green Technology (GT)

Definition

Green Technology (GT) involves developing and applying products, equipment systems and techniques used to conserve the natural environment and resources, which mitigate the negative impact of human activities.

Related Key Areas

1. Clean Energy
2. Green Building and Construction
3. Water and Waste Management
4. Clean Transportation
5. Sustainable Materials and Manufacturing
6. Eco Forestry and Agriculture

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Product specification of green technology products /services / renewable energy to comply with requirements/ standards/ industry best practices
ii. Product and services related to renewable energy following the requirements/ standards/ industry best practices
iii. Green technology products/ services /operations/ measurement and analysis/ report to comply with requirements/ standards/ industry best practices
iv. Carbon calculation process of measuring the amount of CO_2 and other GHG emitted verification for energy audit/ manufacturing process/ current and new technology/green logistic and other related activities
v. Development of products using principles of circular economy material to comply with the circular economy concept
vi. Waste management or treatment technology to comply with requirements/ standards/ industry best practices
vii. Sustainability report to comply with recognised reporting standards, frameworks and guidelines

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Inspection of green technology products/materials to comply with requirements/ standards/ industry best practices
ii. Waste management or treatment technology inspection to comply with requirements/ standards/ industry best practices

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Product testing process on the green technology product/materials to comply with energy-related incentives, policies and legislation
ii. Waste management or treatment technology testing to comply with requirements/ standards/ industry best practices

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Product commissioning process of green technology products/materials to comply with energy-related incentives, policies and legislation

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Product maintenance process of green technology products to comply with energy-related incentives, policies and legislation
ii. Product maintenance or technology maintenance of waste management

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Execution of products/ materials/ infrastructure quality control procedure for according to requirements/ standards/ industry best practices

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Execution of the green technology products/materials/ infrastructures commissioning according to requirements/ standards/ industry best practices

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Execution of the green technology products/materials/ infrastructures maintenance according to requirements/ standards/ industry best practices
ii. Execution of product/technology maintenance of waste management
iii. Testing of green technology products/materials/ infrastructures installation according to requirements/ standards/ industry best practices

REFERENCES

- Electrical Energy Audit Guidelines for Building
- Energy Efficiency and Conservation Act 2024 [Act 861]
- Energy Efficiency Criteria for Electrical Equipment to Qualify for the Minimum Energy Performance Standards Star Rating (MEPS)
- Environmental Quality Act 1974
- [Act 127]
- Government Green Procurement Guidelines & Private Green Procurement
- Green Investment Tax Allowance/Green Investment Tax Exemption (GITA/GITE)
- Green Technology Financing Scheme (GTFS)
- Guidelines on The Connection of Solar Photovoltaic Installation for Self-Consumption, Electric Supply Act 1990 [Act 447]
- Malaysia Plastic Sustainability Roadmap (MPSR)
- MyHijau Mark
- National Competency Standard: Sustainability Reporting
- National Water Services Commission (SPAN) guidelines
- Renewable Energy Act 2011 [Act 725]
- SIRIM ECO 001:2018 - Environmental Quality (Scheduled Wastes) Regulations 2005Eco-Labelling Criteria – Biodegradable and Compostable Plastic and Bioplastic
- Solid Waste and Public Cleansing Management Act 2007 [Act 672]

Health & Medical Technology (HM)

Definition

Health & Medical Technology encompasses the technical development, implementation and management of medical equipment, healthcare ICT systems and related facilities, emphasizing the integration and advancement of technology in supporting healthcare delivery, with a focus on technological expertise distinct from the clinical and patient-focused roles of medical professionals.

Related Key Areas

1. Medical Equipment
2. Medical ICT
3. Healthcare Facilities

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Establishment/ development of prototype testing procedures as per requirements/ standards/ industry best practices
ii. Development of the medical device prototype from approved design as per requirements/ standards/ industry best practices
iii. Prototype testing based on requirements/ standards/ industry best practices
iv. Biocompatibility test conducted on materials as per the required standard and specifications based on requirements/ standards/ industry best practices
v. Pre-clinical physical test conducted on medical device as per the required standard and specifications based on requirements/ standards/ industry best practices
vi. Performance evaluation report of a medical device based on requirements/ standards/ industry best practices
vii. Project brief related to healthcare facilities based on requirements/ standards/ industry best practices
viii. Production of equipment planning and layout for related healthcare facilities based on requirements/ standards/ industry best practices

Product Manufacturing
Certify /approve technology services in respect of any operation relating to:

i. Establishment of the production and assembly planning procedures, modification and refurbishment, labelling and packaging as per the required requirements/ standards/ industry best practices
ii. Machinery specification-based production and assembly planning, modification and refurbishment, labelling and packaging as per the required standard and product specifications

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Establishment of product testing procedure based on requirements/ standards/ industry best practices
ii. Product testing result and compliance report based on requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Establishment of product commissioning procedure based on requirements/ standards/ industry best practices
ii. Compliance report including system integration and/or rectification based on requirements/ standards/ industry best practices
iii. Technical training implementation based on requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Asset, inventory, contract and warranty management of medical device maintenance based on requirements/ standards/ industry best practices
ii. Scheduled and unscheduled maintenance, decommissioning and disposal of medical devices based on requirements/ standards/ industry best practices
iii. Adverse event investigation and report on findings based on requirements/ standards/ industry best practices
iv. Quality and risk management system based on requirements/ standards/ industry best practices

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Execution of product testing based on requirements/ standards/ industry best practices
ii. Product testing report based on standards and product specifications

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. product commissioning based on requirements/ standards/ industry best practices
ii. Product commissioning report including system integration and/or rectification based on requirements/ standards/ industry best practices
iii. Technical training implementation execution based on product manual

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Asset, inventory, contract and warranty management maintenance execution based on requirements/ standards/ industry best practices
ii. Scheduled and unscheduled maintenance execution, decommissioning and disposal of medical devices based on requirements/ standards/ industry best practices
iii. Information collection during adverse event investigation and/or produce a preliminary report on findings based on requirements/ standards/ industry best practices
iv. Quality and risk management maintenance based on requirements/ standards/ industry best practices

REFERENCES

- Good Distribution Practice for Medical Devices (GDPMD)
- ISO13485 - Medical Devices
- ISO14971 - Medical Devices- Application of Risk Management to Medical Devices
- ISO9001 - Quality Management System
- Medical Devices Act 2012 [Act 737]
- MS2058 - Code of Practice Engineering Maintenance Management

Information Communication & Technology (IT)

Definition

Information Technology (IT) refers to the use of computers, software, networks, artificial intelligence (AI) and emerging technologies to collect, process, store and disseminate information. IT encompasses a wide range of current and future tools, including advanced hardware infrastructure, intelligent software applications, databases, cloud computing and AI-driven systems, to enable automation, enhance decision-making and support organisational operations and global connectivity.

Related Key Areas

1. ICT Strategic Management
2. Information and Data Strategy
3. Information Security Management
4. ICT Project Management
5. ICT Infrastructure Management
6. System Development
7. Software Testing and Quality Assurance

IT MBOT
INFORMATION & COMMUNICATION TECHNOLOGY

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Gather and analyse business requirements according to standards/ industry best practices
ii. Hardware, software, data and computer network or related requirements according to the standards/ industry best practices
iii. Product development plan according to the requirements/ standards/ industry best practices
iv. Framework/ blueprint/ roadmap based on the business requirements to comply with standards/ industry best practices

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Architectural design based on the approved framework/ blueprint/ roadmap
ii. Change management according to requirements/ standards/ industry best practices

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Test plan with the criteria and critical factors based on the approved design
ii. Test results based on requirements/ standards/ industry best practices
iii. Quality assurance according to the requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Product deployment cycle based on requirements/ standards/ industry best practices
ii. Product completion endorsement based on the approved design

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Development of maintenance plans based on product life cycle roadmaps
ii. Maintenance activities according to requirements/ standards/ industry best practices

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution of the design architecture framework based on the requirements/ standards/ industry best practices
ii. Testing activity based on requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Product deployment cycle based on the requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Maintenance activities based on requirements/ standards/ industry best practices.
ii. Execution of maintenance activities according to requirements/ standards/ industry best practices

REFERENCES

- The Internet Engineering Task Force (IETF)
- Carrier Ethernet Service Standard (MEF3.0)
- International Requirements Engineering Board (IREB)
- Information Technology Infrastructure Library (ITIL)
- Control Objectives for Information and Related Technologies (COBIT)
- Standard for Information Technology (IEC)
- International Software Testing Qualifications Board (ISTQB)
- American Software Testing Qualification Board (ASTQB)
- ISO/IEC/IEEE 12207:2017 – Systems and Software Engineering - Software Life Cycle Processes

Manufacturing & Industrial Technology (ME)

Definition

Manufacturing and Industrial Technology (ME) involves the design and development, planning process, method and technique of products, quality and product risk analysis.

Related Key Areas

1. Industrial and Manufacturing Planning
2. Design, Development, Simulation and Optimisation
3. Assembly, Disassembly and Packaging
4. Materials and Manufacturing Processes
5. Robotic, Automation and Artificial Intelligence
6. Testing, Commissioning, Metrology and Quality
7. Technical and Product Support
8. Operation, Performance, Reliability and Improvement

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Prototypes/equipment/ components/tools/ systems to comply with requirements/ standards/ industry best practices
ii. Quality assurances/ process flow/material selection to comply with requirements/ standards/ industry best practices
iii. Feasibility studies/ benchmarking in meeting return of investment (ROI) per requirements/ standards/ industry best practices
iv. Production strategy based on requirements, standards and industry best practices

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Process optimisation to comply with requirements/ standards/ industry best practices
ii. Process improvement/ quality control to comply with requirements/ standards/ industry best practices
iii. Rework standards according to requirements/ standards/ industry best practices
iv. Product /equipment maintenance/ calibration comply with requirements/standards/ industry best practices

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Testing procedure and results comply with requirements/ standards/ industry best practices
ii. Product testing report to meet requirements/ standards/ industry best practices
iii. Product's reliability and durability as per requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Commissioning plan for product deployment to meet the installation's quality, resources, timeline and goal
ii. Product commissioning based on requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Maintenance /calibration effectiveness for products or equipment in compliance with requirements/ standards/ industry best practices
ii. Inspection of facilities to ensure compliance with requirements/ standards/ industry best practices
iii. Technical training implementation based on requirements/ standards/ industry best practices

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Testing procedure and results monitoring implementation to ensure compliance with requirements/ standards/ industry best practices
ii. Execution of product testing to meet requirements/ standards/ industry best practices
iii. Product practicability and durability according to requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Execution of commissioning plan for product deployment to meet the installation's quality, resources, timeline and goal
ii. Product commissioning based on requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Maintenance and calibration activities in compliance with requirements/ standards/ industry best practices
ii. Inspection of facilities to ensure compliance with requirements/ standards/ industry best practices
iii. Technical training implementation based on requirements/ standards/ industry best practices

REFERENCES

- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Application Programming Interface (API)
- Deutsches Institut für Normung (DIN)
- Environmental Quality Act, 1974 [Act 127]
- European Standard (EN)
- Factories and Machinery Act 1967 [Act 139]
- ISO 13374 - Condition Monitoring and Diagnostics
- ISO 16355-7:2023 - Applications of Statistical and Related Methods To New Technology and Product Development Process
- ISO 27001- Information Security Management
- ISO 45001:2018 - Occupational Health and Safety Management Systems
- ISO 55001 - Assets Management System
- ISO 9001:2015 - Quality Management Systems
- Japanese Industrial Standards (JIS)
- Occupational Safety and Health (Amendment) Act 2022 [Act A1648]
- Occupational Safety and Health Act 1994 [Act 514]

Material Science Technology (MT)

Definition

Material Science Technology (MT) involves materials selection methods or techniques used to synthesise, produce and/or process materials to obtain the required properties for intended technical and technology services.

Related Key Areas

1. Metal
2. Ceramic
3. Polymer
4. Composite

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Identification of suitable material for product development to comply with technical intention/ technical specification/ requirements/ standards/ industry best practices
ii. Characterisation of the material properties using suitable tools, equipment, methods, techniques and technologies
iii. Establishment, planning, implementation, reviewing, evaluation of product development plan, process ranges, methods, techniques or procedure for materials characterisation and testing to comply with technical intention/ technical specification/ requirements/ standards/ industry best practices and product properties

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Manufacturing/ fabrication/ synthesise/ means of manmade materials process or plan for the product that complies with technical intention/ technical specification/ requirements/ standards/ industry best practices and product properties

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Validation plan for the developed product with reference to national/ international test methods
ii. Non-compliance products test/ rectification with requirements/ standards/ industry best practices and product properties
iii. Test/ technical reports for developed/ rectified products to comply with requirements/ standards/ industry best practices and product properties

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Establishment, planning, implementation, reviewing and evaluation of full-scale production that complies with technical intention/ technical specifications/ requirements/ standards/ industry best practices and product properties
ii. Establishment, planning, implementation, reviewing and evaluation of product quality control plan/ quality assurance plan/ technical report to comply with technical intention/ technical specification/ requirements/ standards/ industry best practices and product properties

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Establishment, planning, implementation, reviewing and evaluation of maintenance plan/ continuous improvement plan for developed products to ensure product reliability and sustainability
ii. Establishment, planning, implementation, reviewing and evaluation of maintenance work to ensure its effectiveness and reliability until the next maintenance cycle

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Developed product testing using suitable tools, equipment, techniques and technologies
ii. Execution for non-compliance products test/ rectification with requirements/ standards/ industry best practices and product properties
iii. Test/ experiment results for developed products that comply with requirements/ standards/ industry best practices and product properties.

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Execution of a full-scale production plan that complies with technical intention/ technical specification/ requirements/ standards/ industry best practices and product properties
ii. Execution/inspection of product quality control plan/quality assurance plan/ technical test to comply with technical specifications and product properties

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Execution of maintenance plan or continuous improvement plan for developed products to ensure product reliability and sustainability
ii. Execution of maintenance work in ensuring its effectiveness and reliability until the next maintenance cycle

REFERENCES

- ISO 6892-1 – Metallic Material Tensile Test
- ISO 527-1 -Plastics: Determination of Tensile Properties
- ISO 148-1 – Metallic Materials: Charpy Pendulum Impact Test
- ISO 6508-1 Metallic Materials: Rockwell Hardness Testing
- ISO 6507-1 Metallic Materials: Vickers Hardness Testing
- ISO 1- Geometrical Product Specifications (GPS): Standard Reference Temperature for The Specification of Geometrical and Dimensional Properties
- ISO 1099 – Metallic Materials: Fatigue Testing-Axial Force-Controlled Method
- ISO 204 - Metallic Materials — Uniaxial Creep Testing in Tension — Method of Test
- ISO 6502 - Rubber — Measurement of Vulcanization Characteristics Using Curemeters
- ISO 9227 - Corrosion Tests in Artificial Atmospheres — Salt Spray Tests

Maritime Technology (MI)

Definition

Maritime Technology (MI) involves the technique and method used in operation, maintenance, manufacturing, navigation and control systems of ships and related marine vessels, including technology and technique used in ports, oil rigs and other marine facilities.

Related Key Areas

1. Seafaring
2. Navigation
3. Seamanship
4. Marine Engineering
5. Cargo
6. Ship
7. Boats
8. Oil Rigs
9. Ports
10. Submersible
11. Aid to Navigation (AtoN)

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Modifications for the maritime/ offshore/ green port initiative system to align with requirements/ standards/ industry best practices

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Manufacturing/ modification of the maritime system to ensure adherence to the design and maritime industry standards
ii. Offshore system modification to ensure adherence to the design and maritime industry standards
iii. New plan modification for green port to ensure adherence to design and maritime industry standards

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Maritime equipment sample results, in line with requirements/ standards/ industry best practices
ii. Results of offshore equipment sampling, in line with requirements/ standards/ industry best practices
iii. Progress of green port initiatives, in line with requirements/ standards/ industry best practices
iv. Equipment functionality, basic system operational status and vessel traffic services (VTS) equipment logbook update

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Quality control procedures according to requirements/ standards/ industry best practices
ii. Installation results in compliance requirements/ standards/ industry best practices
iii. Regulatory requirement, VTS boundary environment, ship and vessel movement in traffic separation scheme (TSS) and gazetted area to comply with requirements/ standards/ industry best practices

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Maintenance plan/work to ensure its sustainability until the next maintenance cycle
ii. Green port plan, to ensure its continuity until the next maintenance cycle
iii. Establishment of VTS communication and maintain communication information and any navigation system to sustain safe navigation in gazetted area

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Execution of maritime equipment sampling and samples of offshore equipment in line with requirements/ standards/ industry best practices
ii. Implementation of green port in line with requirements/ standards/ industry best practices
iii. Execution of equipment functionality, basic system operational status and VTS equipment logbook update

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Installation of marine equipment according to requirements/ standards/ industry best practices
ii. Execution of quality control procedures to ensure the readiness of offshore operations following requirements/ standards/ industry best practices
iii. Execution of planned green port initiatives by complying with requirements/ standards/ industry best practices during the installation process
iv. Installation of a maritime system based on the regulatory requirement, VTS boundary environment, ship and vessel movement in TSS and gazetted area to comply with international standards

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Maritime/offshore maintenance system to ensure its sustainability until the next maintenance cycle
ii. Green port maintenance, to ensure its continuity until the next maintenance cycle
iii. Maintenance of VTS communication and communication information and any navigation system to sustain safe navigation in gazetted area

REFERENCES

- Boat Rules 1953
- Domestic Shipping Licensing Board
- Federation Ports Rules 1953
- International Convention for The Prevention of Pollution from Ships (MARPOL)
- International Convention for The Safety of Life at Sea (SOLAS)
- International Maritime Organization (IMO): Guidance and Instruction on Arrangements "To The Satisfaction of The Administration"
- Merchant Shipping (Amendment) Act 1998 [Act A1014]
- Merchant Shipping (Tonnage) Regulations 1985 [P.U (A) 83/1985]
- Merchant Shipping Act (Oil Pollution) 1994 [Act 515]
- Merchant Shipping Ordinance 1952 - Merchant Shipping (Near Coastal Trade) Voyage limit Rules 1994
- Merchant Shipping Ordinance 1952 -Merchant Shipping (Central Mercantile Marine Fund) Rules 1984
- P.U (A) 151/99 Merchant Shipping (Medical Examination) Rules 1999
- Penang Port (Navigation Within The Area of The Brigde) Rules 1986
- Petroleum (Safety Measures) (Transportation of Petroleum by Water) Regulation 1985
- Ports (Privatization) Act 1990 [Act 422]
- Standards of Training, Certification and Watchkeeping for Seafarers (STCW)
- State Ports Rules
- Territorial Sea Act 2012 [Act 750]

Marine Technology (MR)

Definition

Marine Technology (MR) involves processes and techniques used in studying, conserving, exploring, protecting and intervention of the marine environment.

Related Key Areas

1. Fisheries
2. Aquaculture
3. Conservation
4. Exploration
5. Pollution
6. Eco-system
7. Oceanography
8. Oceanology

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Development of new technologies for fisheries/ marine ecosystem management according to requirements/ standards/ industry best practices
ii. Establishment of new aquaculture systems according to requirements/ standards/ industry best practices
iii. Integration of approaches/ methods for monitoring/ detecting/ protecting marine resources according to requirements/ standards/ industry best practices

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Field data collection using integrated equipment to ensure it meets requirements/ standards/ industry best practices
ii. Integration of the equipment into a system for marine conservation according to requirements/ standards/ industry best practices
iii. Newly invented approach for monitoring/modelling/ simulating/ prevention/ detecting and intervention according to requirements/ standards/ industry best practices
iv. Aquaculture products manufacturing to ensure it complies with requirements/ standards/ industry best practices

v. Inspection of equipment produced for fisheries and marine activities according to requirements/ standards/ industry best practices

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Fishing equipment/ methods/ techniques/ software to ensure its effectiveness and safety for use in managing fisheries
ii. Aquaculture systems/methods/ technologies to ensure its functionality/ effectiveness/ reliability and safety in the field
iii. Surveys analysis of potential new marine resources to ensure resource sustainability

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. New equipment/technologies to ensure its functionality
ii. Adjustment of new aquaculture systems/ new breeds to ensure its effectiveness
iii. Inspection of integrated systems to ensure its functionality and meet requirements/ standards/ industry best practices
iv. Technologies integration/ structural applications/interventions to ensure they are functioning correctly and meet oceanographic research objectives

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Scheduled maintenance work to meet requirements/ standards/ industry best practices
ii. System/equipment troubleshooting to ensure its functionality without compromising the productivity of the organisation
iii. Identification of potential operational problems and possible solutions to ensure the functionality, reliability and safety of the systems or equipment

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Quality control and accuracy procedures on the functionality of products according to requirements/ standards/ industry best practices
ii. Environmental/ field fitness safety before utilisation of technology according to requirements/ standards/ industry best practices
iii. Product malfunction incident plan/ accident plan of hazardous / non-performing products situation according to requirements/ standards/ industry best practices
iv. Marine equipment failure/aquaculture products failure /disease-infected aquatic animals' documentation

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Installation of the equipment and system software to ensure it functionality and meet requirements or readiness to operate
ii. Documentation of installation procedures to facilitate more efficient operation/solution readiness as well as easiness in maintenance

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Scheduled maintenance work on equipment and system software upgrades to ensure sustainability until the next maintenance cycle
ii. Implementation of troubleshooting to ensure easiness of maintenance work till the next cycle
iii. Routine water parameter checking to ensure a suitable living environment for aquatic animals

REFERENCES

- Animal Act 1953 [Act 647]
- Animal Welfare Act 2015 [Act 772]
- Environmental Quality Act 1974 [Act 127]
- Fire Services Act 1988 [Act 341]
- Fisheries Act 1985 [Act 317]
- Fisheries and Aquaculture Development Act 2009
- Fisheries Regulations 1993
- Lembaga Kemajuan Ikan Malaysia Act 1971 [Act 49]
- Malaysian Quarantine and Inspection Services Act 2011 [Act 728]
- National Parks Act 1980 [Act 226]
- Veterinary Surgeons Act 1974 [Act 147]

Nanotechnology (NT)

Definition

Nanotechnology (NT) is a technology performed on a nanometre scale (1nm to 100nm) that involves the design, prototyping, production, characterisation and application of structures, devices and systems in various industrial sectors by controlling shape, size and functionality at the nanometre scale.

Related Key Areas

1. Semiconductor
2. Surface Science
3. Microfabrication
4. Molecular Technology
5. Nanomedicine
6. Nano Electronics
7. Energy

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify/ approve technology services in respect of any operation relating to:

i. Research and/or development of nanomaterials synthesis methods according to requirements/ standards/ industry best practices
ii. Exploration of synthesised nanomaterials' potential application according to industry needs and demand
iii. Feasibility assessment of nano-based product development to ensure appropriate technology readiness level
iv. Development of SOP for nanomaterials and nano-based products to meet product specification

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Manufacturing process of the nano-based/ nanomaterials products according to requirements/ standards/ industry best practices
ii. Ensuring the nano-based product manufacturing process meets product specifications

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Quality control and testing procedures for each aspect of nano-based product testing following established requirements/ standards/ industry best practices/ regulations
ii. Ensuring the nano-based product testing process meets product specifications

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Design, installation and process of unit operations in compliance with requirements/ standards/ industry best practices
ii. Safety assessment of the nanotechnology-based products for acquiring approval from the relevant authorities
iii. Risk assessment protocol for nanotechnology safety in compliance with requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Maintenance work on nanotechnology unit operations to ensure its sustainability until the next maintenance cycle
ii. Postmortem of maintenance work for the next course of action
iii. Inputs on preventive maintenance efforts for continuous improvement

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Testing procedure of nanomaterials and nano-based products following SOP to meet product specification
ii. Execution of quality control and testing procedures for each aspect of nano-based product testing following established standards and regulations
iii. Calibration of the testing equipment for appropriate measurement of nano-based products to achieve accuracy, reproducibility and repeatability of the results

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Setting-up/installation/ troubleshooting/repairing of nanotechnology-related equipment in compliance with standard regulatory
ii. Execution of risk assessment for the nanotechnology safety of products and processes in compliance with regulations

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Maintenance work on nanotechnology unit operations until the next maintenance cycle
ii. Inputs on preventive maintenance efforts for continuous improvement
iii. Record and/or report any anomalies/ unsolved issues involving nanotechnology unit operation for continuous improvement

REFERENCES

- National Measurement System Act 2007 [Act 675]
- A A Methodology for Developing Nanomaterial Testing Standards. SICE Journal of Control, Measurement and System Integration
- Environmental Quality Act 1974 [Act 127]
- ISO/IEC 17025 - General Requirements for The Competence of Testing and Calibration Laboratories
- ISO 10993-5:2009 - Biological Evaluation of Medical Devices Part 5: Tests for In Vitro Cytotoxicity
- ISO/TC 229 - Nanotechnologies
- MS ISO/IEC 17025:2017 - General Requirements for The Competence of Testing and Calibration
- National Metrology Institute of Malaysia (NMIM)
- Occupational Safety and Health Act 1994 [Act 514]
- OECD Test Guidelines for Chemicals
- Use and Standard of Exposure to Chemical Hazardous to Health (USECCH) Regulations

Nuclear & Radiological (NR)

Definition:

Nuclear & Radiological (NR) involve the techniques, skills, methods and processes used in the peaceful application of radiation in consumer products, food and agriculture, industry, medicine and scientific research, transport, water resources and the environment.

Related Key Areas

1. **Ionizing**
   Nuclear Power, Radiotherapy, Radiology, Food Radiation, Stable Isotope, Nuclear Medicine, Nuclear Safety & Security, Mutation Breeding, Radiographic Testing
2. **Non-ionizing**
   Ultraviolet, Microwave, Laser, Infrared

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Nuclear and radiological technology development complies with acts/ requirements/ standards/ industry best practices
ii. Radioactive materials, nucleonic gauges, irradiating facilities and safety control system development in compliance with the acts, standards and regulatory requirements
iii. New technology applications to improve safety and security use and handling of radioactive material/ nuclear instruments/ facilities according to acts/ requirements/ standards/ industry best practices

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. SOP for production of radioisotopes/ nucleonic devices/ irradiation facility installation procedure to comply with the acts, regulations, standards and design
ii. Inspection of the production of radioisotopes/ nucleonic devices/ irradiation facility installation process to comply with the acts, regulations, standards and design
iii. Technical requirements for radioisotopes/ nucleonic devices/ irradiation facilities/nuclear and radiological technology in compliance with acts/ standards/ requirements/ industry best practices

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Testing and assessment on radiological safety and warning systems, radiation protection, general conditions of the irradiation facilities, nucleonic gauges and protective equipment in ensuring its integrity and good functionality compliance with standards
ii. Quality control for periodic safety checks on radiological safety and warning systems/ radiation protection/ general conditions of the irradiation facilities/ nucleonic gauges /protective equipment/ nuclear and radiological technology in ensuring its integrity and good functionality compliance with standards
iii. Improvised standard operating procedure or application of radioactive material and facilities related to the maintenance of irradiating apparatus or facility
iv. Acceptance test for radiation instrument/ apparatus prior to commissioning and ensure its compliance with radiation safety standards and regulation

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Quality control procedure and safety guidelines for public and radiation workers and ensure its compliance with acts and radiation safety standards
ii. Technical guidelines to improve safety and security use and handling of radioactive material and nuclear instruments and facilities to achieve higher operations reliability/ standards
iii. Technology application from research and development to be applied in industry

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Maintenance of radiological safety and warning systems/ radiation protections/ irradiation facilities/ nucleonic gauges/ protective equipment in ensuring its integrity and good functionality compliance with standards
ii. Quality control for periodic safety checks on radiological safety and warning systems/ radiation protections/ irradiation facilities/ nucleonic gauges / protective equipment to ensure its integrity and good functionality compliance with requirements/ standards/ industry best practices
iii. SOP/ application of radioactive material and facilities that related to maintenance of irradiating apparatus/ facility

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Calibration test for the nucleonic gauges, radiation monitoring instruments and irradiators to ensure their integrity and good functionality
ii. Execution of technical support on verification of the existence of radioactive material based on the needs and demands of industrial players
iii. Document/ product of the radionuclide existence and concentration in the environment in compliance with the standard and regulations
iv. Technical reporting of the testing or services using nucleonic gauges, radiation monitoring instruments and irradiators that follow regulations, standards and guidelines

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Quality control procedure and safety guidelines for public and radiation workers during commissioning and ensure its compliance with radiation safety standards and acts
ii. Technical support to improve safety and security during the use and handling of radioactive material and nuclear instruments and facilities to achieve higher operations reliability or standards
iii. Technical support in identifying and certifying technical technology applications from research and development to be applied in the industry

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Execution of maintenance on radiological safety and warning systems, radiation protection, irradiation facilities, nucleonic gauges and protective equipment in ensuring its integrity and good functionality compliance with standards
ii. Execution of quality control for periodic safety checks on radiological safety and warning systems, radiation protections and irradiation facilities and nucleonic gauges and protective equipment in ensuring its integrity and good functionality compliance with standards
iii. Implementation of standard operating procedures or application of radioactive material and facilities that related to the maintenance of irradiating apparatus or facility

REFERENCES

- Atomic Energy Licensing Act 1984 [Act 304]
- Code of Practice on Radiation Protection of Non-Medical Gamma & Electron Irradiation Facilities (LEM-TEK-57)
- IAEA Safety Data Series: Calibration and Testing of Radiation Detection Instruments
- International Atomic Energy Agency (IAEA) Safety Data Series: Calibration and Testing of Radiation Detection Instruments
- MS838:2018 - Radiation Protection For Medical Diagnostic Xray
- National Nuclear Technology Policy (DTNN) 2030
- Radiation Protection (Basic Safety Standards) Regulations 2010
- Radiation Protection and Safety of Radiation Sources
- Standard Operating Procedure (SOP) of Non-Radioactive Rare Earth Elements (NR-REE) Mining in Perak
- United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)

Oil & Gas Technology (OG)

Definition

Oil & Gas Technology (OG) involves the technology, practices, processes, procedures and techniques used and implemented in petroleum exploration and production, petroleum transportation (pipeline system), refining and processing, petroleum and related product manufacturing and energy production.

Related Key Areas

1. Exploration and Production
2. Chemical Process and Product
3. Logistics Oil and Gas
4. Energy and Utilities

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Facilitate the oil and gas-related programs/ activities/ processes/ manufacturing/ services to comply with design/ requirements/ procedures/ standards/ industry best practices
ii. Technology, digital products and services to improve production, operation and safety performance, efficiencies and reliabilities
iii. Technical assurance of oil and gas activities, products and services to improve the exploitation of resources, production, operation and safety, performance, efficiencies and reliability of the work, activities and plants

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Oil and gas products manufacturing process and services to comply with design/ requirements/ standards/ industry best practices
ii. Establishment of guidelines, workflow and procedures for oil and gas products manufacturing processes and services to comply with design/ requirements/ standards/ industry best practices

Product Testing
Certify /approve technology services in respect of any operation relating to:

i. Facilitate the oil and gas products testing and services according to design/ requirements/ standards/ industry best practices
ii. Establishment of guidelines, workflow and procedure for oil and gas products testing and services to comply with design/requirements/ standards/ industry best practices
iii. Technical assurance of oil and gas products testing and services according to design/requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Oil and gas products commissioning and service to comply with design/ requirements/standards/industry best practices
ii. Development for oil and gas products commissioning and service to comply with design/ requirements/standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Oil and gas products maintenance and services to comply with design/ requirements/standards/ industry best practices
ii. Development of oil and gas products maintenance and service to comply with design/ requirements/standards/ industry best practices

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution of oil and gas products testing and services to comply with design / requirements/standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Execution of oil and gas product commissioning and services conduct to comply with design/requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Execution of oil and gas maintenance and service to comply with design/ requirements/standards/ industry best practices

REFERENCES

- Industry Standards
- Design Requirements
- Safety Guidelines
- Standard Operating Procedure (SOP)
- Related technical guidelines

Resource-based, Survey & Geomatics Technology (RB)

RB MBOT
RESOURCE BASED, SURVEY & GEOMATICS TECHNOLOGY

Definition

Resource-based, Survey & Geomatics Technology (RB) involves application and technique to identify, measure, utilise and sustain natural resources based on information processes or spatially referenced data.

Related Key Areas

1. **Geographic Information System (GIS)**
   Database, inventory, agriculture, land used, geological survey, forest, geospatial data, wildlife, blasting
2. **Remote Sensing**
   Forest, geomatics-imaging, land used
3. **Land Survey**
   Global Navigation Satellite System (GNSS), Computer-Aided Design (CAD), survey and mapping, geological survey
4. **Mineral**

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Identification of potential mineral deposits or mineral resources through geological surveys
ii. Sample, test and analyse through geological survey methods
iii. Extraction of minerals / natural resources from the ground according to the standards, procedures and regulations
iv. Interpretation of geological and natural resources data
v. Research/ feasibility/ exploration to improve understanding of geological processes/ exploration techniques /resource extraction/ natural resources advancement
vi. Testing and analysis standards of rocks, soils, natural resources and water samples to identify mineral composition and environmental impact assessment

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Optimisation of the natural resources/mineral/survey / GIS processes to maximise production and efficiency
ii. Integration of data related to appropriate analytical tools data collected to monitor and assess environmental changes, land use and natural resources

iii. Estimation of sizes /grade/ economic viability of mineral deposits through geological modelling and statistical analysis according to data and reporting standards
iv. Extraction and refinement of minerals / natural resources from ore, including crushing, grinding and chemical treatment

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Sampling and testing of natural resources-based procedures, analysis and interpretation of data to ensure its functionality
ii. Measurements or testing tools for the natural resources based/ geomatics/ survey instruments in a designated area of interest
iii. Standards testing and analysis of rocks, soils, natural resources and water samples to identify mineral composition and assess environmental impacts

Product Commissioning

Certify /approve technology services in respect of any operation relating to:

i. Quality control procedure during installation according to requirements/ standards/ industry best practices
ii. Mapping/ assessment of potential mineral deposits / natural resources in a designated area under varied environmental conditions
iii. Maintenance planning for the location and condition of utilities and infrastructure in various environmental conditions within the designated area
iv. Analyse/model the relevant data and natural resources to comply with design standards
v. Installation process related to survey/ GIS/ natural resources

Product Maintenance

Certify /approve technology services in respect of any operation relating to:

i. Maintenance work to ensure operational and safety
ii. Appropriate and functionality of the machinery, devices, operational systems and equipment in mining/ surveying/ GIS/ geomatics operations

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing

Certify /approve technical services in respect of any operation relating to:

i. Quality control procedure according to GIS standard, procedure and regulation database or any relevant GIS platform
ii. Calibration of the GIS / survey / geomatics device/equipment to ensure data accuracy, reliability and performance according to standards
iii. Collection and management of field data using accurate surveying tools/ instruments / relevant database
iv. Calibration of GIS /survey/geomatics equipment to ensure data accuracy, reliability and performance according to standards
v. Standards testing and analysis of rocks, soils, natural resources and water samples to identify mineral composition and assess environmental impacts

Product Commissioning

Certify /approve technical services in respect of any operation relating to:

i. Inspection of the quality control procedures during installation according to requirements/ standards/ industry best practices
ii. Execution and installation of the relevant technology to map and assess potential mineral deposits/ natural resources
iii. Maintenance support for the location and condition of utilities and infrastructure in various environmental conditions within the designated area
iv. Data collection and GIS modelling to comply with design standards during the installation process
v. Installation process related to survey/ GIS/ natural resources

Product Maintenance

Certify /approve technical services in respect of any operation relating to:

i. Maintenance work to ensure operational and safety
ii. Appropriate and functionality of the machinery, devices, operational systems and equipment in mining/ surveying/ GIS/ geomatics operations
iii. Data functionality to ensure the accuracy, currency and security of GIS/ any relevant natural resources-based data

REFERENCES

- Geological Survey Act 1974 [Act 129]
- Mineral Development Act 1994 [Act 525]
- MS1759 – Geographic Information/ Geomatics -Feature and Attribute Codes
- National Mineral Industry Transformation Plan 2021-2030 (TIM 2021-2030)
- State Mineral Enactments

Telecommunications & Broadcasting Technology (TB)

Definition

Telecommunications & Broadcasting Technology (TB) involves developing, installing, testing, commissioning, operating and maintaining the system before content delivery, including acquisition, production, transmission, contribution and distribution of information through various media platforms.

Related Key Areas

1. Transmission
2. Radio Infra
3. Broadcasting
4. Studio Engineering

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Design of solutions/processes/ procedures based on technical requirements/ standards/ industry best practices
ii. Product development proposals based on technical requirements and market trends

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. FAT based on technical requirements/ standards/ industry best practices
ii. Technical installation based on requirements/ standards/ industry best practices

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Validation of test procedures for proposed designs based on requirements/ standards/ industry best practices
ii. System UAT based on requirements/ standards/ industry best practices
iii. Product operating parameters to comply with requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Product installation according to requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Repair works/condition-based maintenance, preventive maintenance and emergency recovery based on the manufacturer's manual, working methods or any related documents
ii. Fault incident reports according to complaint and troubleshooting methodology within the agreed scope of work
iii. Product and system performance parameters and measurements for the identification of improvement areas

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Execution of test procedure based on requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Installation of product/ material according to requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Maintenance activities for telecommunication and broadcasting equipment according to requirements/ standards/ industry best practices
ii. Execution of troubleshooting within the agreed scope of works

REFERENCES

- Audio Engineering Society (AES) Standards
- Communication and Multimedia Act 1998 [Act 588]
- European Broadcasting Union (EBU) Standards
- International Mobile Telecommunications-2020 (IMT-2020 Standard)
- International Telecommunication Union (ITU) Standards
- ISO 9001 - Quality Management System
- Malaysian Technical Standards Forum Bhd (MTSFB) Standards
- Society of Motion Picture and Television Engineers (SMPTE) Standards

Transportation & Logistic Technology (TL)

Definition

Transportation & Logistics Technology (TL) refers to the integration and application of advanced technologies to optimise the movement and transportation of people, goods and services across various modes, including land, sea and air. It encompasses the use of digital tools, automation, data analytics and communication systems to enhance efficiency, reliability and safety in the transportation and logistics industries, facilitating seamless coordination and management of supply chains and mobility networks.

Related Key Areas

1. Railway
2. Shipping
3. Road
4. Cargo
5. Warehouse
6. Supply Process
7. Inventory Control
8. Packaging, Handling, Storage and Tracking (PSH&T)

SCOPE OF WORK FOR PROFESSIONAL TECHNOLOGIST

Product Development

Certify /approve technology services in respect of any operation relating to:

i. Testing procedure through comprehensive testing and obtaining necessary certifications
ii. Transportation and logistics product development according to specific requirements/ standards/ industry best practices
iii. Establishment of manufacturing processes and supply chains to enable the scalable production of transportation and logistics product

Product Manufacturing

Certify /approve technology services in respect of any operation relating to:

i. Set up/ perform / review assembly processes for the transportation and logistics products using assembly lines/ fabrication methods/ other manufacturing techniques, tailored to the specific type of transportation and logistics product being produced
ii. Establishment of quality control measures and inspection processes to ensure that manufactured products comply with specified requirements/standards/industry best practices

Product Testing

Certify /approve technology services in respect of any operation relating to:

i. Test plans and strategies based on requirements/ standards/ industry best practices

ii. Establishment of acceptance criteria based on requirements/ standards/ industry best practices

Product Commissioning
Certify /approve technology services in respect of any operation relating to:

i. Commissioned transportation and logistics products to the end-users / operators in accordance with product requirements/ standards/ industry best practices

ii. Establishment of a formal process for handing over the commissioned transportation and logistics products to the end-users or operators, ensuring alignment with requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technology services in respect of any operation relating to:

i. Transportation and logistics assets maintenance to meet requirements/ standards/ industry best practices

SCOPE OF WORK FOR CERTIFIED TECHNICIAN

Product Testing
Certify /approve technical services in respect of any operation relating to:

i. Functional testing to ensure that transportation and logistics products adhere its intended functions

Product Commissioning
Certify /approve technical services in respect of any operation relating to:

i. Installation of functional testing system to ensure compliance requirements/ standards/ industry best practices
ii. Functional results that meet requirements/ standards/ industry best practices

Product Maintenance
Certify /approve technical services in respect of any operation relating to:

i. Inspection of transportation and logistics assets and identification of any signs of issues
ii. Maintenance activities as prescribed by requirements/ standards/ industry best practices

REFERENCES:

- EN 13261- Railway Applications, Track- Test Methods for Fastening Systems
- EN 13306- Maintenance - Maintenance Terminology
- EN 50110 - Operation of Electrical Installations
- EN 50126 – Command, Control and Signalling, Roling Stock and Fixed Installations
- EN 50128 – Railway Application- Communication, Signalling and Processing Systems
- EN 50129 – Requirements for The Acceptance and Approval of Safety-Related Electronic Systems in The Railway Signalling Field
- EN 60204-1 - Safety of Machinery- electrical Equipment of Machines
- EN 61010-1 Safety Requirements for Electrical Equipment for Measure Unit, Control and Laboratory Use
- IS014001 - Environmental Management System
- ISO16355 - Application of Statistical & Related Method to Technology and Product Development Process
- ISO22301 - Supply Chain Management
- ISO27001 - Information Security Management System
- ISO31000 - Risk Management
- ISO37001 - Anti- Bribery Management System
- ISO45001 - Occupational Health and Safety Management System
- ISO9001 - Quality Management System

Technology & Technical Working Group (TTWG)

The Technology & Technical Working Group (TTWG) is a diverse group of MBOT professionals collaborating to enhance professionalism and expertise. TTWG aids MBOT in developing the professional services standard by shaping legal frameworks, elevating practices across technological domains and promoting best practices through standards and guidelines.

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	10.	Nurul Dayana binti Darmawi	MBOT

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This is the First Edition of the standard and is subject to periodic review and updates to reflect advancements in technology, changes in industry practices and regulatory developments.

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