MINISTRY OF HUMAN RESOURCES

INDUSTRIAL SKILLS FRAMEWORK

FOR MACHINERY & EQUIPMENT (M&E) SUB SECTOR

MPC

HRDF

MEiF
Machinery & Engineering Industries Federation

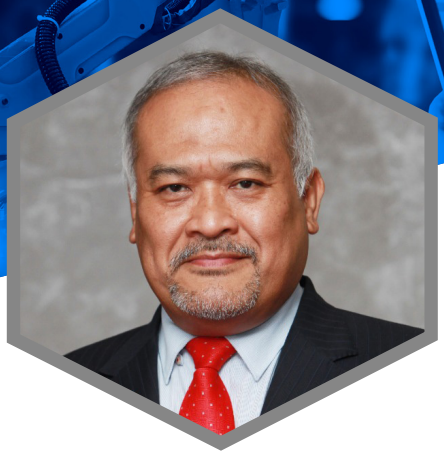
DISCLAIMER

Jointly Published by

Malaysia Productivity Corporation
P.O. Box 64, Jalan Sultan
46904 Petaling Jaya
Selangor Darul Ehsan
MALAYSIA
Tel: +(603) 7955 7266
Fax: +(603) 7957 8068
Email: marketing@mpc.gov.my
Website: www.mpc.gov.my

Pembangunan Sumber Manusia Berhad
Wisma HRDF
Jalan Beringin, Damansara Heights
50490 Kuala Lumpur
MALAYSIA
Tel: 1800 88 4800
Fax: +(603) 2096 4999
Email: support@hrdf.com.my
Website: www.hrdf.com.my

FOREWORD



Under the Third Industrial Master Plan (IMP3) 2006 - 2020, investments in the M&E industry is targeted to grow by an average of 3.7% per annum. By 2020, investments in the industry are projected to reach RM30.8 billion, while exports are expected to grow at an average rate of 6.7% per annum, to reach RM48.3 billion. To support this growth, the Eleventh Malaysia Plan (11MP) set a target of 3.5% labour productivity growth per annum for the M&E sector to RM86,276 by 2020.

However, the M&E sector's productivity remains a key challenge. Labour productivity lags by 3.3 times of the Chemicals sector and 1.8 times of the E&E sector. To achieve the ambitious targets of the M&E sector, the competencies and productivity levels of the workforce need to be raised further. The two-pronged strategy outlined in the 11MP calls for increasing automation and continuous training.

I commend the Machinery and Equipment Productivity Nexus (MEPN) team on this initiative to produce the Industrial Skills Framework for Machinery & Equipment (M&E) Sub Sector in collaboration with Machinery and Engineering Industry Federation (MEIF) and the Human Resources Development Fund (HRDF). I am confident that this publication will greatly benefit all stakeholders - government, employees, employers and training providers – in the M&E industry ecosystem. Hence, I urge all parties to make full use of this publication.

This Framework will be a critical roadmap for the systematic development of the entire M&E Industry's value chain as it enables industry players to identify the skills gaps within the Industry and develop the relevant training programmes to close them. For employees, this will serve as a blueprint for their career development, enabling them to prepare themselves to achieve their full potential in the sector.

I am also pleased to note that this publication will be disseminated throughout the relevant ministries, agencies and companies in the M&E sector, as well as related industries. This shows a commitment to making a concerted effort towards a common goal. Let us work together to raise the productivity of this critical sector so that we can enjoy the fruits of continued growth and prosperity of the nation together.

YBhg. Dato' Abdul Haji Latif Hj Abu Seman
Director General, Malaysia Productivity Corporation (MPC)

FOREWORD

The Human Resources Development Fund (HRDF) has continuously worked towards increasing efficiency at the workplace by equipping the Malaysian workforce with proper skills, competencies and trainings. This therefore requires us to work hand in hand with players from the industry to align training needs with suitable certification programs. A well planned investment in human capital development will boost the growth of the industry and economy of Malaysia in the long term.

The recent COVID-19 pandemic has impacted most industries and has rendered conventional job positions obsolete. There are calls for flexible working methods and new jobs that will allow employees to work remotely while maintaining current productivity. HRDF has quickly realized that there is a need to revamp our approach in reaching out to the industry for the purpose of up-skilling and reskilling employees. Our biggest challenge at this point is to aggressively assist retrenched and unemployed Malaysian workers to get back into the workforce.

As such, this Industrial Skills Framework (IndSF) is a well-timed effort geared towards addressing the current challenges of assisting Malaysians to be successfully hired based on new skills and competencies that are required by the industry. Here I would like to take this opportunity to congratulate all members of the Sectoral Training Committee (STC) on Electric, Electronics and Machinery Support, subject matter experts from the industry and especially Malaysia Productivity Nexus for their tireless effort in developing this IndSF document. It is indeed an honour to deliver this initiative to the Malaysian workforce. HRDF looks forward to being the driving force in shaping and empowering our Malaysian workforce so that they are globally competitive and skilful.

Shahul Hameed Dawood
CHIEF EXECUTIVE, HRDF

FOREWORD

The Machinery & Equipment Productivity Nexus (MEPN), is one of the nine Nexus under the Malaysia Productivity Blueprint. The target productivity growth for the M&E sector is 3.5% per annum. This represents a huge jump from the existing productivity growth of 1.1% in Year 2019.

In order to achieve this target, one of the initiatives that is needed, is to establish a University-Industry-Government-Civil Society partnership to develop a M&E Talent Development Roadmap, aligned to Industry 4.0 and catering for the future development of M&E industry as well. We firmly believe that talent is the key to success.

Thus, the project of M&E Talent Development Roadmap or commonly known as Industrial Skills Framework was initiated last year. The initiative concentrated on 4 parts mainly Sectorial Information, career path, skills categories and relevant training programs.

The objectives of Industrial Skills Framework is to provide a common reference for skills and competencies required in M&E industry mainly:

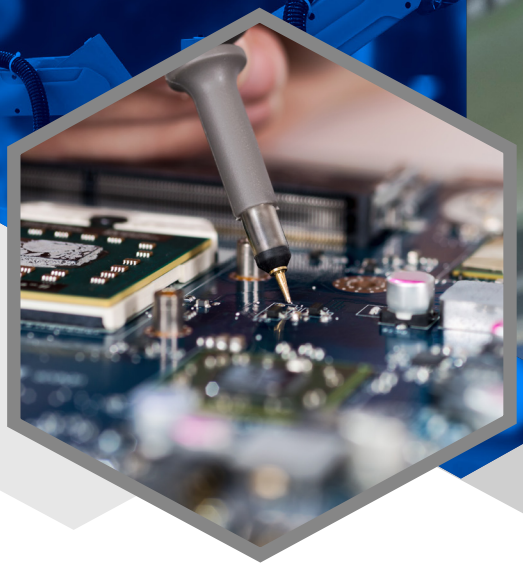
- To assist individuals in making the right decisions on skills development,
- Employers to recognize skills and invest in skills training for their employees and
- Training providers to design program that address the sub-sector's manpower and skills needed.

Through this sectoral requirements, I foresee a series of training programs designed by HRDF approved training providers to address the skill gap between talent supply and demand.

I would like to take this opportunity to congratulate all members of MEPN working group, subject matter experts from industry and especially Human Resource Development Fund (HRDF) for their tireless effort and contribution in developing this Industrial Skills Framework document.

Mac Ngan Boon
Champion
Machinery and Equipment Productivity Nexus (MEPN)

ABSTRACT



This Industrial Skills Framework is developed with a purpose to identify the work scope of the occupational areas for Machinery & Equipment sub sector and the competencies required for the workers for each of the job title determined. It is used to analyse skilled human resource competency requirements for the sector. The development of the Occupational Structure is practicable to the industry to benchmark their manpower planning and staff development planning.

The outcome of this analysis is also crucial for training institute in developing relevant training programmes for the specific job areas in this industry. The document in turn will be developed to be used as the basis to conduct skills training and certification of competent personnel. This document is divided into several chapters, the first two chapters being an industry overview highlighting the definition and scope of the sector, the current analysis of the local sector and its skilled worker requirements, Government bodies and development plans supporting the growth of the sector.

Workshops were held to get a better understanding of the organisational structure, job titles, hierarchy objectives and main activities of the specified positions. The final chapters will present the findings of the Industrial Skills Framework that is translated into the skills framework (Sector, Sub Sector and Job Area clustering), career pathway (for each Job Title and Job Area), job profiling table and job description for each of the job titles identified. In order to conduct the Industrial Skills Framework on the Machinery & Equipment Sub Sector, all the information related to the aforesaid sector was gathered through literature review, surveys and further discussed in workshop sessions with experts from the sector.

The Machinery and Equipment (M&E) industry has been of strategic importance throughout the global industrial revolutions as one of the fundamental enablers for all economic segments such as the primary, manufacturing and services industries. The M&E industry represents one of the most innovative sectors in the economy, which combines all of the key future technologies including electronics, robotics, materials and software integration and thus a key player in the next industrial revolution - Industry 4.0. Based on the findings obtained throughout the Occupational Analysis on the industry, 32 job areas have been identified and confirmed to be in tandem with MSIC 2008 with 132 job titles.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AC	Alternating Current
BDA	Big Data Analytics
BOM	Bill of Materials
CAD	Computer-Aided Design
CAE	Computer-Aided Engineering
CAM	Computer-Aided Manufacturing
CNC	Computer Numerical Control
COL	Critical Occupational List
CSC	Critical Skills Monitoring
DC	Direct Current
DoSH	Department of Occupational Safety and Health
DoSM	Department of Statistics Malaysia
DSD	Department of Skills Development
DT	Destructive Testing
E&E	Electric & Electronic
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interference
EMP	Electro-Magnetic Pulse
ERP	Enterprise Resource Planning
FAT	Factory Acceptance Test
FEA	Finite Element Analysis
FPGA	Field Programmable Gate Array
GD&T	Geometrical Dimensioning and Tolerancing
GDP	Gross Domestic Product
HSE	Health, Safety and Environment
IIoT	Industrial Internet of Things
ILMIA	Institute of Labour Market Information and Analysis
IP	Ingress Protection
IPC	Industrial Personal Computer
IR 4.0	Industrial Revolution 4.0
ISIC	International Standard Industrial Classification
ISO	International Organisation for Standardisation
KPI	Key Performance Indicator

LIST OF ABBREVIATIONS

LFPR	Labour Force Participation Rate
M&E	Machinery & Equipment
M2M	Machine to Machine
MC	Microcontroller
MEGA	Missouri Educator Gateway Assessments
MEIF	Machinery & Engineering Industries Federation
MEMA	Machinery and Equipment Manufacturers Association
MIDA	Malaysian Investment Development Authority
MITI	Ministry of International Trade and Industry
MNC	Multinational Corporation
MPC	Malaysia Productivity Corporation
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework
MSC	Malaysian Skills Certificate
MSIC	Malaysian Standard Industrial Classification
MSTMA	Malaysian Special Tooling and Machining Association
N.E.C	Not Elsewhere Classified
NCS	National Competency Standard
NDT	Non-Destructive Testing
NOSS	National Occupational Skills Standard
OA	Occupational Analysis
OD	Occupational Description
OECD	Economic Co-Operation and Development
OF	Occupational Framework
OS	Occupational Structure
OEE	Overall Equipment Effectiveness
OSHA	Occupational Safety and Health Act
PCB	Printed Circuit Board
PLC	Programmable Logic Controller
PSoC	Programmable System on Chip
QA	Quality Assurance
QMS	Quality Management System
R&D	Research & Development

LIST OF ABBREVIATIONS

SAT	Site Acceptance Test
SBC	Single Board Computer
SME	Small and Medium Enterprises
SPC	Statistical Process Control
TNA	Training Needs Analysis
TQM	Total Quality Management

GLOSSARY

Computer-Aided Design	The use of a wide range of computer-based tools that assist engineers, architects, and other design professionals in their design activities to create physical designs, usually three-dimensional.
Computer Numerical Control	The digital control of a physical machine that consists of a series of integrated actuators, power electronics, sensors, and dedicated computer running under a real-time operating system.
Critical Occupational List	A list of occupations for which there is strong evidence that there is significant labour market shortage that may be alleviated through government action.
Fourth Industrial Revolution (IR 40)	The current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, Virtual Reality (VR) and Artificial Intelligence (AI) are changing the way we live and work.
Industrial Automation Engineering	A combination of electronics, mechanics, and electrical, and includes the control or interaction of computers, motors, hydraulics, pneumatics, and other processes which are applied and used within manufacturing.
Industry4WRD	Malaysia's national policy on Industry 4.0, which calls for a smarter and stronger manufacturing sector driven by people, processes, and technologies. Industry4WRD is a collaborative effort between the Government, industry, and academia, aiming for enhanced productivity, greater job creation, and the creation of a high-skilled talent pool in the manufacturing sector.
Labour Demand	Indicates the total labour that the economy is willing to employ at any given point of time.
Labour Force	As the sum of persons in employment and persons in unemployment. Together, these two groups of the population represent the current supply of labour for the production of goods and services taking place in a country through market transactions in exchange for remuneration.
Machinery & Equipment Industry	To catalyse Malaysia's transition into a high-technology, Industry 4.0-ready nation, due to its linkages to various large-scale economic sectors such as manufacturing and services.
Machining	Any of various processes in which a piece of raw material is cut into a desired final shape and size by a controlled material-removal process. The processes that have this common theme, controlled material removal, are today collectively known as subtractive manufacturing, in distinction from processes of controlled material addition, which are known as additive manufacturing.

GLOSSARY

Manufacturing	The process of transforming materials or components into finished products that can be sold in the marketplace.
Manufacturing industry	One that engages in the transformation of goods, materials or substances into new products. The transformational process can be physical, chemical or mechanical. Manufacturers often have plants, mills or factories that produce goods for public consumption. Machines and equipment are typically used in the process of manufacturing.
Occupational Description (OD)	A broad, general, and written statement of a specific job, based on the findings of the job analysis.
Occupational Framework (OF)	The outcome of Occupational Framework of identifying the work scope of the occupational areas in terms of competencies.
Prototype	An engineering-quality sample build of a product, typically intended to test high-risk aspects of the design.
Quality Assurance	The maintenance of a desired level of quality in a service or product, especially by means of attention to every stage of the process of delivery or production.
Quality Management	The act of overseeing all activities and tasks needed to maintain a desired level of excellence. This includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement.
Tooling	Hardware (or software) that is developed specifically for a part so that when that tool is inserted into a general-purpose machine, that machine will produce or shape that part uniquely.

ABOUT THE INDUSTRIAL SKILLS FRAMEWORK

01

The Industrial Skills Framework is designed to provide information for a range of audiences, including apprentices, training providers and employers.

The development of the Industrial Skills Framework is also tied to Industry 4WRD National Policy Strategy S2: Ensure the availability of future talent by equipping workers with the necessary skillsets to work in the Industry 4.0. The rationale is ensuring the pipeline of future talent in the manufacturing sector is important as advances in manufacturing techniques and processes require a more highly-skilled and more educated workforces.

The focus on technical and vocational education and training (TVET), science, technology, engineering and mathematics (STEM) education will be the priority to ensure a continual supply of highly qualified talent. Structured industrial training programmes between industry and academia can close the gap between classroom modules and skills required in the environment. There is also a need to raise a profile of high-tech manufacturing industry as an attractive workplace and career option.

This framework may serve as a quick guide for those involve in manpower development planning. This document will help them to structure their manpower development programmes more objectively. This development of the framework covers the definition of M&E industry, including the Engineering Support Services (ESS). But the content of the framework does not include the overall value chain and eco-system of M&E industry (as per Figure 1.1). The focus area and scope of the development also refer to established occupational standard definition, such as MASCO and MSIC 2008 document.

OBJECTIVES

» Individuals make the right decision on skills development.

» Employers to recognise skills and invest in skills training for their employees

» Training providers to design programmes that address the manpower and skills needed.

ABOUT THE INDUSTRIAL SKILLS FRAMEWORK 01

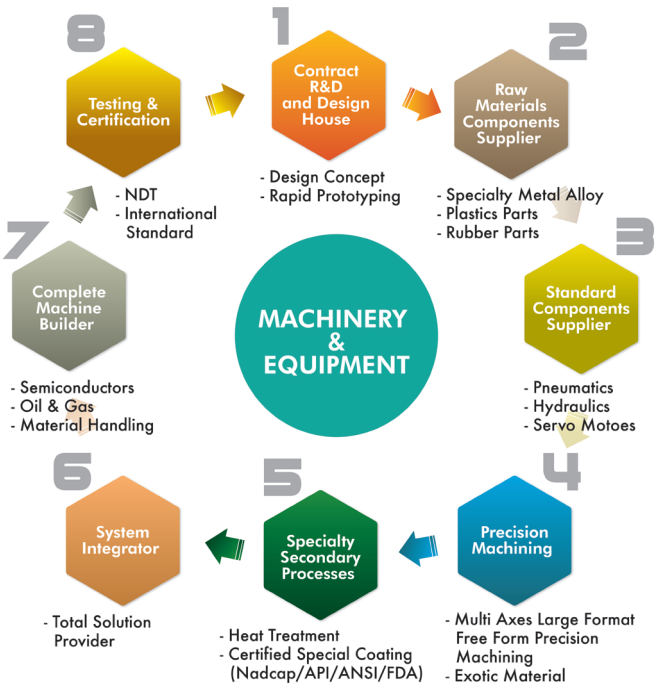


Figure 1.1: Value Chain Activities in M&E Industry

THE FRAMEWORK IS ORGANISED INTO THREE MAIN SECTIONS

» Occupational Structure

» Job Profiling

» Job Competencies and Skills Categories

The framework captures the consensus of the focus group consisting of employers, subject matter experts and expert workers in M&E. The focus group explored M&E industry by identifying job areas, career pathways, key job functions and competencies. The framework also provides information on the required standard of the occupations and the underlying knowledge and skills deemed critical to the development of those competencies.

Employers may use the framework as a reference to develop their own training programme based on their organisations' objectives. The framework is not intended to dictate the industry on developing employees' skills competency.

The Industrial Skills Framework is based on a number of resources such as input from Focus Group Discussion (FGD), studies on occupational standard and supply and demand report published by various agencies in Malaysia. These agencies are Department of Skills Development (DSD), Institute of Labour Market Information and Analysis (ILMIA), TalentCorp Malaysia and many other reports related to Machinery and Equipment (M&E) sub sector in Malaysia.

The most important part of the framework development process is the composition of focus group members. They are selected based on their credentials, vast hands-on experience and possessed a minimum 7-year experience in M&E sector. Their expertise and insights are imperative to this document which is relevant to the current industry development.

01 ABOUT THE INDUSTRIAL SKILLS FRAMEWORK

The Industrial Skills Framework for Machinery & Equipment sector provides information on:

1	SECTORIAL INFORMATION	JOB PROFILE	4
2	OCCUPATIONAL STRUCTURE	SKILLS SET	5
3	CAREER PATHWAY	RELEVANT TRAINING PROGRAM	6

Figure 1.2 Development Scope for Industrial Skills Framework

While the Industrial Skills Framework is designed for use in competency-based programmes, they can well be used to develop and implement time-based or hybrid apprenticeships or to guide the development of other types of vocational education and academic programmes. With the Skills Framework, individuals are equipped to make informed decisions about career choices, as well as take responsibility for skills upgrading and career planning.

ASSESS CAREER INTERESTS	PREPARE FOR DESIRED JOBS	UPSKILLING & RESKILLING	PROFESSIONAL & LICENSING
» Discover employment opportunities	» Understand required skills and competencies	» Identify relevant training programmes to equip oneself with the required skills and competencies	» Plan for career development/ transition
» Understand career pathways	» Recognise required skills and competencies for the intended job role	» Participate in on-the-job training opportunities provided by the company.	» Identify training programmes to upgrade and improve skills
» Recognise required personal attributes			» To obtain a professional license
			» Get recognition from licensing body

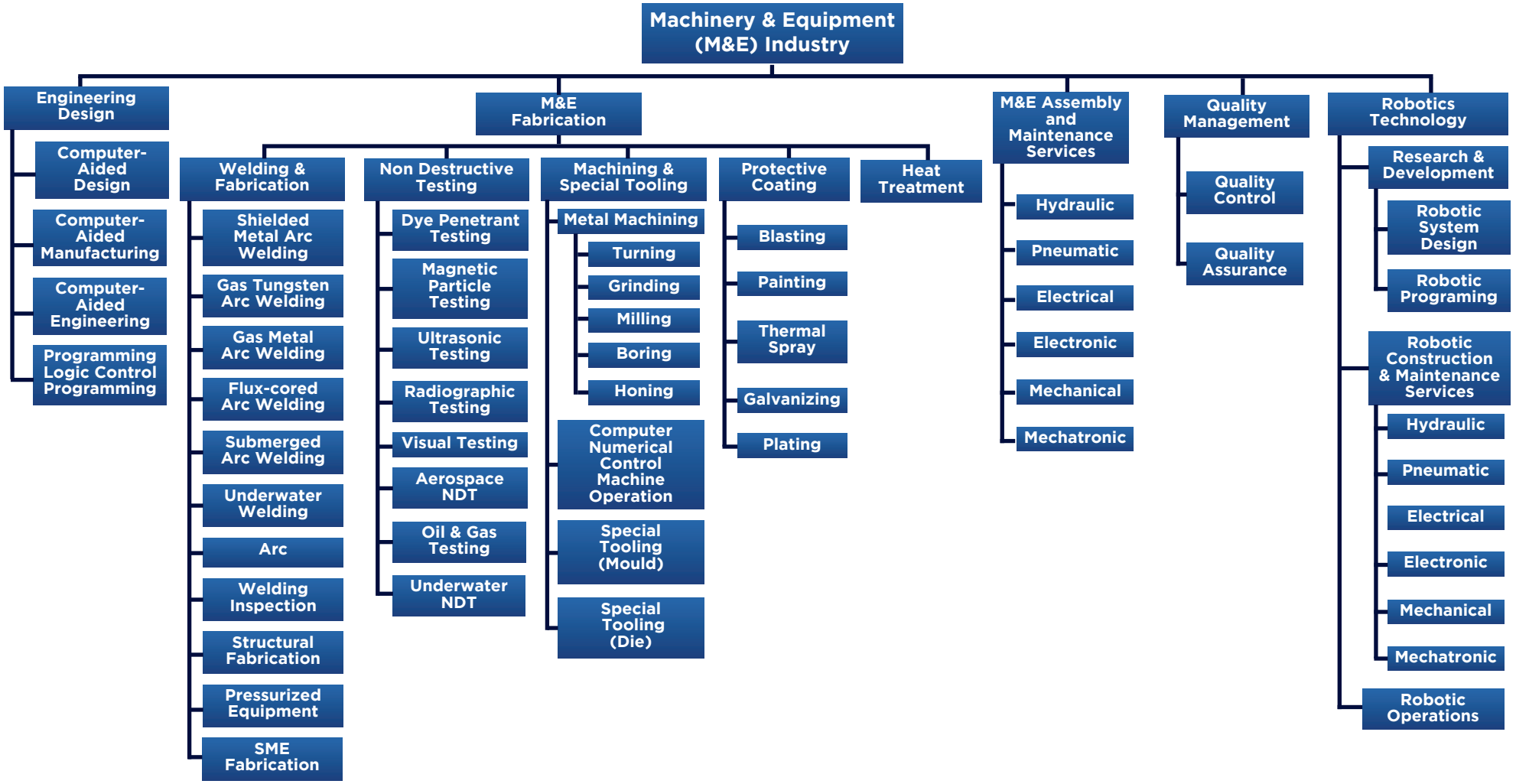
Table 1.1 Employment pathways for M&E

M&E industry comprises many industry players that support each other. Figure 1.3 shows list of industry players that involve directly in M&E industry.

ABOUT THE INDUSTRIAL SKILLS FRAMEWORK

01

Figure 1.3 Value Chain Structure of M&E Industry



SECTORIAL INFORMATION 02

2.1 SCOPE OF INDUSTRY

Machinery manufacturing is one of the largest and most competitive sectors of Malaysia. According to MIDA, the M&E industry serves as the catalyst for Malaysia's transition into a high-technology, Industry 4.0-ready nation, due to its linkages to various large-scale economic sectors such as manufacturing, construction and services.

Machinery and equipment manufacturing industries provide a range of essential products and technology for applications in several other manufacturing and service industries. The market is driven by wide applications of information technology in machinery, technology innovations in machinery, and advancements in process control. Increased efforts by key industry players to combine specialized architecture, engineering, and logistics and produce highly efficient equipment and machinery are factors that fuel the growth of the market.

The Machinery and Equipment (M&E) sector has been identified as one of the catalytic sub-sectors under the 11th Malaysia Plan due to its cross-cutting linkages with all economic segments such as the primary, manufacturing and services sectors. The growth will focus on the manufacturing of high value added and high technology M&E.

2.2 INDUSTRIAL LANDSCAPE IN MALAYSIA

The economic impact of machinery manufacturing extends throughout the Malaysian economy. Machinery industries provide essential and highly sophisticated technology for many other manufacturing and service industries. Industrial process controls and other automation technologies enable end-users to maximize the productivity of their equipment. Sales of many types of machinery are accompanied by a variety of high-value services as well, including specialized architecture, engineering, and logistics.

Driven by industry trends including Industry 4.0 and the Industrial Internet of Things (IIoT), M&E companies are currently revolutionising their production processes, adopting key Industry 4.0 technologies to increase the level of automation, connectivity, and big data analytics (BDA) required in a smart factory environment. This includes connecting cyber and physical systems via an Enterprise Resource Planning (ERP) system, as well as employing remote monitoring, machine-to-machine (M2M) communication, and fully robotic, automated assembly lines in their production floors. A local company has ventured into developing software and platforms as well as providing ERP, production monitoring and supply chain management services and solutions to manufacturing companies.

Malaysia is the leading manufacturer of specialised-process machinery for M&E industry and automation equipment in the SEA region. They can produce advanced machinery with full automation and robotics handling systems, and can easily integrate themselves into global supply chains, exporting their products worldwide.

SECTORIAL INFORMATION 02

Malaysia is home to 1,418 M&E companies across multiple fields.

Providing world-class design & development, test simulation and software programming, structure fabrication, module assembly & integration, and automation solutions services.

Investments projected to reach RM30.8 billion, while exports are expected to reach RM48.3 billion in 2020.

A total of 77 projects with investments amounting to RM2.2 billion were approved in 2017

Figure 2.1: Industrial Landscape in Malaysia

Innovation and R&D will spur the growth of more sophisticated M&E. Access to financing for this may prove to be a challenge; especially from the commercial financial sector, which usually evaluates such loan applications conservatively. This could be an area of interest for potential investors seeking to enter the market and help integrate industry players in the global supply chain through strategic collaborations.

Malaysia Gross Domestic Product (GDP) recorded RM 1,362.8 billion in 2018, grew by 4.8 percent as compared to 5.7 percent in 2017. Services and manufacturing remain the main contributors of with 56.7 percent and 22.4 percent respectively.

[1]Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 1

SECTORIAL INFORMATION 02

In 2018, Machinery and Equipment industry contributed 3.2 percent which is RM9.7 billion of the manufacturing total GDP of RM304.8 billion. This industry GDP increased by 5.3 percent compared to 5.2 percent in 2017.

Exports of M&E have exceeded more than RM40.6 billion in 2018, grew by 2.1 percent and are expected to grow at an average annual growth rate of 4.1 percent to reach RM43 billion in 2020. Export destinations include Singapore, the U.S.A and Japan. Meanwhile, Imports recorded a value of RM73.6 billion in 2018 and imports are mainly for advanced, high-tech machines and components and some general machinery & equipment that are not available locally.

2.3 CHALLENGES FACED BY THE INDUSTRY IN EMPLOYMENT

A study was conducted by ILMIA on the talent supply for M&E industry in Malaysia. Based on the findings, it stated that there are huge talent gaps in the M&E sector, and highlighted the need for more stakeholder collaborations. Figure 2.2 and Figure 2.3 show the industry has difficulties in recruiting skilled workers and professionals in M&E sector[4].

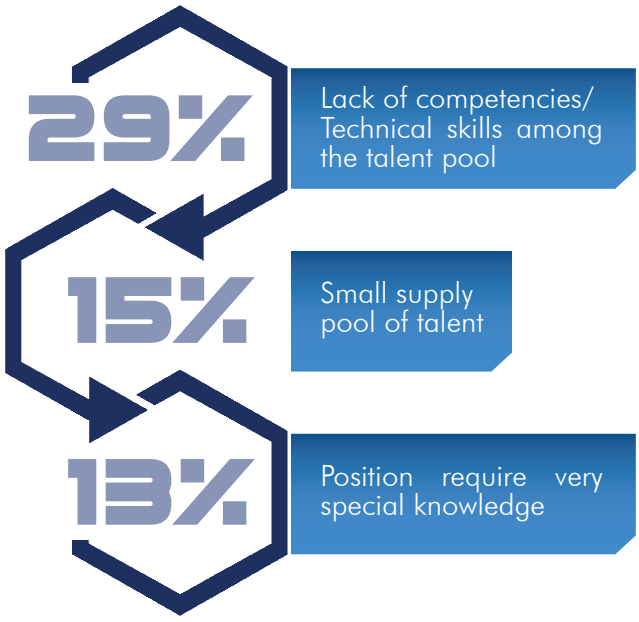


Figure 2.2: Top 3 reasons for difficulty in recruitment of hard to fill positions

Figure 2.3: Top 3 skills gap of entry level employees

[2]Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 42
[3]Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 38
[4]Institute of Labour Market Information and Analysis (ILMIA). 2019. M&E Environmental Scan 2018

SECTORIAL INFORMATION 02

2.4 EMPLOYMENT DEMAND IN MACHINERY & EQUIPMENT INDUSTRY

Labour demand indicates the total labour that the economy is willing to employ at any given point of time. At the microeconomic level, labour demand by firm refers to positions in the company; and through the process of hires and separations, the information by filling positions and vacancies can be estimated.

2.4.1 LABOUR FORCE IN MALAYSIA

Labour force can be defined as the sum of persons in employment and persons in unemployment. Together these two groups of the population represent the current supply of labour to produce goods and services taking place in a country through market transactions in exchange for remuneration[5]. The concept and definition of the labour force in Malaysia are stated in Figure 2.4 below.

WORKING AGE

All persons aged between 15 to 64 years who are either in the labour force or outside the labour force.

LABOUR FORCE

All persons in the working age who are either employed or unemployed.

EMPLOYED

All persons who, at any time during the reference week worked at least one hour for pay, profit or family gain either as employers, employees, own account workers or unpaid family workers.

UNEMPLOYED

All persons who did not work during the reference week and are classified into two groups that are actively unemployed and inactively unemployed.

OUTSIDE LABOUR FORCE

All persons not classified as employed or unemployed are classified as outside labour force. This category consistes of housewives, students (including those going for further studies), retirees, disabled person and those not interested in looking for jobs.

Figure 2.4: Concept and definition of labour force in Malaysia

[5]International Labour Organization. 2018.Labour force (2019, 30 September)
Retrieved from https://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/WCMS_470304/lang--en/index.htm

SECTORIAL INFORMATION 02

2.4.2 EMPLOYMENT AND PRODUCTIVITY OF MACHINERY AND EQUIPMENT INDUSTRY

The M&E Industry employed 103,679 employees in 2017 which encompasses4.7 percent of the total manufacturing workforce. This industry employees grew with Compound Annual Growth Rate (CAGR) of 6.8% per annum since 2015.

The industry registered a Labour productivity of RM82,700, lower than RM94,000 that registered in 2015. This resulted from minimal increase of added value as compared to the increased of employees for the respective period.

TOTAL	No. of Employees	Labour Productivity (Added Value/ employee) (RM)
2017	103,679	83,700
2015	86,401	94,000

Figure 2.5 No of Employees and Labour Productivity in Machinery and Equipment Industry

2.5 THE WAY FORWARD

In light of recent economic development plans in Malaysia towards Industry 4.0, M&E companies in Malaysia are currently revolutionising their production processes, adopting key Industry 4.0 technologies to increase the level of automation, connectivity, and big data analytics. Skills and competencies of the workforce is essential to produce economic value in an organization as well as industry. Workforce need to be equipped with continuous training and development for new skills and technologies update. Thus, consistency supply of skilled workforce that tailor to industry needs, help to enhance industry's productivity and its contribution to Malaysia's GDP.

[6] Department of Statistic Malaysia (DOSM). (2018). Annual Economic Statistic 2018

SKILLS FRAMEWORK 03

Skills Framework provides a summary of the occupations and to get a clear picture of what the job entails, the context and setting in which this work is typically performed and the career pathway available to individuals in the occupation.

THE DEVELOPMENT OF THE SKILLS FRAMEWORK CONSISTS OF TWO (2) MAIN PART, WHICH INCLUDE;

- Occupational Structure (OS)
- Job Description Table

3.1 DEVELOPMENT OF OCCUPATIONAL STRUCTURE (OS)

The content of the OS consists of 3 main items detailed as below:

1. Job Area - Focusing one's occupational concentration on a specific area of expertise

2. Occupation Title and other Potential Job Titles used to identify the occupation. The occupational title identifies the specific job role for which the apprentice is being trained. It is important to use nomenclature that describes a job, as opposed to using a title that describes an occupational field, which may include numerous jobs performed at varying levels of expertise and autonomy.

3. Occupational Pathways - This section describes the possible career pathways for someone who completes an apprenticeship in this field and aspires to move to higher level positions or occupations. The competencies required for the career movement can be attained either from formal education or on the job training experience.

SKILLS FRAMEWORK 03

3.1.1 DESCRIPTION OF LEVEL

The development of the Occupational Structure (OS) is based on standard competency level for each job area. This is to ensure that the OS can be referred to any level of business organisation from SMEs to MNCs.The competency level was also based on the three domains which include the Knowledge, Skills & Competence domain areas.

LEVEL	DESCRIPTION OF LEVEL	
6	Knowledge	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles.
	Skills	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study.
	Competence	Manage complex technical or professional activities or projects, take responsibility for decision making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups.
5	Knowledge	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge.
	Skills	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.
	Competence	Exercise management and supervision in contexts of work or study activities where there is an unpredictable change; review and develop performance of self and others.
4	Knowledge	Factual and theoretical knowledge in broad contexts within a field of work or study.
	Skills	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.
	Competence	Exercise self-management within the guidelines of work or study contexts that are usually predictable but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.
3	Knowledge	Knowledge of facts, principles, processes and general concepts, in a field of work or study.
	Skills	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information.
	Competence	Take responsibility for completion of tasks in work or study; adapt own behavior to circumstances in solving problems.
2	Knowledge	Basic factual knowledge of a field of work or study.
	Skills	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools.
	Competence	Work or study under supervision with some autonomy.
1	Knowledge	Basic general knowledge.
	Skills	Basic skills required to carry out simple tasks.
	Competence	Work or study under direct supervision in a structured context.

Figure 3.1: Description of Level

SKILLS FRAMEWORK 03

3.1.2 CAREER PATH STRUCTURE

The career path structure is describing career progression of technical personnel. Personnel may progress to the technical expert role or may opt to progress to managerial roles. Consulting firms would groom their engineers into management, some larger firms have paths that allow engineers to maintain a highly technical role throughout their careers. The career progression of the two pillars is described in Figure 3.2: Career Path Structure.

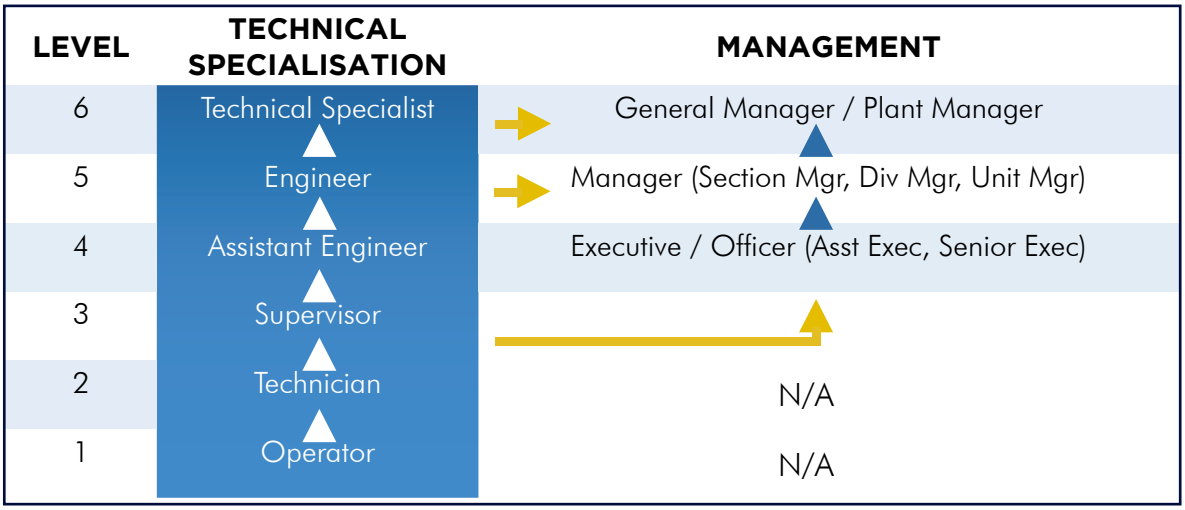


Figure 3.2: Career Path Structure

SKILLS FRAMEWORK 03

3.1.3 JOB ENTRY LEVEL

The job entry level and requirements for this structure are based on industry practice. This framework only describes the career path structure for the job area. The employment or recognition for the job title will be based on the company internal procedure. Most companies specify the job entry-level based on academic qualifications such as a diploma or a degree. There are also companies that recognise their employees based on the experience and competency level. The government is keen on promoting the TVET related programmes in Malaysia, certificates from the technical and vocational education pillars are now recognised by the industry as one of the job entry levels for employment.

3.1.4 OCCUPATIONAL STRUCTURE (OS)

An Occupational Structure (OS) is used to identify the work scope of the occupational areas in terms of competencies. It is used to analyse skilled human resource competency requirements for the sector. The development of the OS is a preliminary process in developing the human capital development in any industry. The OS is described and analysed by means of various classificatory schemes, which group similar occupations together according to specific criteria such as skill, employment status, or job function.

The chapters will present the findings of the study that is translated into the OS and levels of competencies. The total of job areas identified is 32 with a total of 138 job titles was identified. Table 3.1 to Table 3.6 show the OS developed for M&E Industry.

SKILLS FRAMEWORK

03

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES			
JOB AREA	MACHINERY & EQUIPMENT (M&E) DESIGN			
SUB AREA/LEVEL	RESEARCH & DEVELOPMENT (R&D)			
	ELECTRICAL	ELECTRONIC	MECHATRONIC	MECHANICAL
6	R&D Lead Engineer			
5	R&D Electrical Engineer	R&D Control System Engineer	R&D Mechanical Engineer	
4	R&D Electrical Assistant Engineer	R&D Control System Assistant Engineer	R&D Mechanical Assistant Engineer	
3	Electrical Supervisor	Electronics Supervisor	Mechatronics Supervisor	Mechanical Supervisor
2	Electrical Technician	Electronics Technician	Mechatronics Technician	Mechanical Technician
1	No Level	No Level	No Level	No Level

Table 3.1: Occupational Structure (1 of 6)

SKILLS FRAMEWORK

03

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES							
JOB AREA	M&E FABRICATION							
SUB AREA/ LEVEL	MACHINING & SPECIAL TOOLING							
	METAL MACHINING			COMPUTER NUMERICAL CONTROL (CNC) MACHINE OPERATION			SPECIAL TOOLING (MOULD)	SPECIAL TOOLING (DIE)
6	Metal Machining Specialist						Special Tooling (Mould) Specialist	Special Tooling (Die) Specialist
5	Metal Machining Engineer						Special Tooling (Mould) Designer	Special Tooling (Die) Designer
4	Metal Machining Assistant Engineer						Special Tooling - Mould Maker	Special Tooling - Die Maker
3	Machining Supervisor			CNC Machine Supervisor			Machine Supervisor	Machine Supervisor
2	Machinist			CNC Machinist			Machinist	Machinist
1	Machine Operator (Turning, Milling, Boring)	Grinding Machine Operator	Honing Machine Operator	Turning CNC Machine Operator	Milling & Boring CNC Machine Operator	Grinding CNC Machine Operator	Machine Operator	Machine Operator

Table 3.2: Occupational Structure (2 of 6)

SKILLS FRAMEWORK

03

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES					
JOB AREA	M&E FABRICATION					
SUB AREA\ LEVEL	HEAT TREATMENT	PROTECTIVE COATING				
		BLASTING & PAINTING		THERMAL SPRAY	GALVANISING	PLATING
6	No Level	No Level		No Level	No Level	No Level
5	Heat Treatment Metallurgist	Blasting & Painting Engineer		No Level	No Level	No Level
4	Heat Treatment Assistant Metallurgist	Blasting & Painting Assistant Engineer		No Level	No Level	No Level
3	Heat Treatment Supervisor	Blasting & Painting Supervisor		Thermal Spray Supervisor	Galvanising Supervisor	Plating Supervisor
2	Heat Treatment Operator	Blasting & Painting Technician		Thermal Spray Painter	Galvanising Technician	Plating Technician
1	No Level	Blaster	Painter	Painter	Galvaniser	Plating Operator

Table 3.3: Occupational Structure (3 of 6)

SKILLS FRAMEWORK

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES								
JOB AREA	M&E ASSEMBLY, TESTING AND REPAIR								
SUB AREA/ LEVEL	PROCESS ENGINEERING	INDUSTRIAL ENGINEERING	HYDRAULIC	PNEUMATIC	ELECTRICAL	ELECTRONIC	MECHANICAL	MECHATRONIC	AUTOMATION
6	No Level	No Level	Hydraulics Specialist	Pneumatics Specialist	Electrical Specialist	Electronics Specialist	Mechanical Specialist	Mechatronics Specialist	Automation Specialist
5	Process Engineer	Industrial Engineer	Hydraulics & Pneumatics Engineer		Electrical Engineer	Electronics Engineer	Mechanical Engineer	Mechatronics Engineer	Automation Engineer
4	Process Assistant Engineer	Industrial Assistant Engineer	Hydraulics & Pneumatics Assistant Engineer		Electrical Assistant Engineer	Electronics Assistant Engineer	Mechanical Assistant Engineer	Mechatronics Assistant Engineer	Automation Assistant Engineer
3	Production Supervisor	Production Supervisor	Hydraulics Supervisor	Pneumatics Supervisor	Electrical Supervisor	Electronics Supervisor	Mechanical Supervisor	Mechatronics Supervisor	Automation Supervisor
2	Production Technician	Production Technician	Hydraulics Technician	Pneumatics Technician	Electrical Technician	Electronics Technician	Mechanical Technician	Mechatronics Technician	Automation Technician
1	No Level	No Level	No Level	No Level	No Level	No Level	No Level	No Level	No Level

Table 3.4: Occupational Structure (4 of 6)

SKILLS FRAMEWORK 03

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES	
JOB AREA	QUALITY MANAGEMENT	
SUB AREA\ LEVEL	QUALITY CONTROL	QUALITY ASSURANCE
6	No Level	No Level
5	Quality Control Engineer	Quality Assurance Engineer
4	Quality Control Assistant Engineer	Quality Assurance Assistant Engineer
3	Quality Control Supervisor	
2	Quality Control Inspector	
1	No Level	No Level

Table 3.5: Occupational Structure (5 of 6)

SKILLS FRAMEWORK

03

SECTOR	MACHINERY & EQUIPMENT (M&E) SERVICES							
JOB AREA	INDUSTRIAL AUTOMATION ENGINEERING							
SUB AREA/ LEVEL	ROBOTIC ENGINEERING				AUTOMATION SYSTEM ENGINEERING			
	ROBOT DESIGN	INTEGRATED ROBOTIC SYSTEM DESIGN	ROBOTIC PROGRAMMING	ROBOTIC OPERATION CONTROL & MAINTENANCE	ELECTRICAL	ELECTRONIC	MECHATRONIC	MECHANICAL
6	Robotic Engineering Specialist			Robotic Operation Specialist	Electrical Automation System Specialist	Electronic Automation System Specialist	Mechatronic Automation System Specialist	Mechanical Automation System Specialist
5	Robot Designer	Robotic System Design Engineer	Robotic Programming System Analyst	Robotic Operation Engineer	Electrical Engineer	Electronics Engineer	Mechatronics Engineer	Mechanical Engineer
4	Robot Assistant Designer	Robotic System Design Assistant Engineer	Robotics Lead Programmer	Robotic Operation Assistant Engineer	Electrical Assistant Engineer	Electronics Assistant Engineer	Mechatronics Asst. Engineer	Mechanical Assistant Engineer
3	Robot Making Technician	Robotic System Design Technician	Robotics Programmer	Robotic Operation Operator	Electrical Supervisor	Electronics Supervisor	Mechanical Supervisor	Mechatronics Supervisor
2	No Level	No Level	No Level	No Level	Electrical Technician	Electronics Technician	Mechanical Technician	Mechatronics Technician

Table 3.6: Occupational Structure (6 of 6)

SKILLS FRAMEWORK 03

3.2 JOB DESCRIPTION TABLE

The job description table was developed to give employer on the general and specific information on the job by outlining the responsibilities, the related skills and the knowledge required to perform the job. The construction of the content is based on the input from the subject matter expert (SME) collected during a brainstorming session. The job description and training content table were developed to serve two (2) main target which is the employer and also as a reference for training and education centre.

i. Purpose of Job Description Table for employer

Job Description Table is a broad, general, and written statement of a specific job, based on the findings of a job analysis. It is a summary of findings that helps employers to determine what an employee is supposed to do based on the determined position. Job description carried for general purpose typically includes the job summary, duties, purpose, responsibilities, scope, and working conditions of a job along with the job title. The item analysed in the job responsibilities table includes the Job Summary, Related Occupational Title, Pre-Requisites, Salary Range, Job Area, Competency Areas, Skills Category, Related Skills and Engineering Fundamental.

ii. Purpose of Job Description Table for Training and Education centre

Based on the details on the job description table, training and education centre can compose their training syllabus based on their targeted group and learning objective. The information on the table which includes the competency area, related skills and engineering fundamentals were outlined specifically for the job title based on the industry/SMEs input.

The table was designed so it can be referred and translated into a training outline for short term or long-term courses. For example, the training centre can use the engineering fundamentals as one of their specific training modules for their short-term training or combined it with related skills based on the targeted group learning objective. They can also refer to the competency area and skills category column for overall competency requirement for long-term courses. This can be used by any TVET institute offering skills program and also by any academic education centre that offering certificate or degree program based on their specific discipline.

The details of the job description table can be referred to Annex 2.

04 RECOMMENDATION AND CONCLUSION

Based on the findings obtained throughout the Occupational Structure on the industry, 32 job areas have been identified and confirmed to be in tandem with MSIC with 132 job titles which 68 of them are defined as a critical job title.

The job titles identified require a holistic view in the development of standard, skills training and certification for recognition. This study provides a more comprehensive view of the industry needs in terms of skill development and thus assist human capital development activities to be determined and planned.

4.1 RECOMMENDATION

During the development of the framework, the industry has proposed a few suggestions to ensure the continuity and sustainability of the framework. The recommendations are as follow:

» **To extend the framework coverage to "Traits Specialisation" job area.**
The framework was developed based on the industry definition of M&E Sector. The job area is focused on the determined area in M&E Industry.

However, there are a lot of other related job areas that involve in the production of M&E product including the "Traits Specialisation" job areas which include Welding and Non-Destructive Testing (NDT). It is important that the Skills Framework for the Traits Specialisation to be developed as the industry really requires the expertise in that field.

» **To extend the training coverage to the M&E product users.**
M&E product came with all levels of complexity. There are products that require special license either from the manufacturer or statutory and regulatory body. Job titles such as Tower Crane Operator requires professional license before one can enter the industry. The industry has proposed that the government should extend the training coverage for the M&E industry, including the users of the products which require licensing requirements.

» **Development of one-stop central portal for M&E Human Capital Development.**
A one-stop central portal for M&E is a platform where multiple services are offered. The portal can be used as a platform to integrate all the stakeholders in the industry, including the industry players, training centres, employees and the apprentices. The platform will provide all the information on the M&E industry, including the latest industry information, incentives offered and the latest government direction for M&E sector.

RECOMMENDATION AND CONCLUSION

The most important feature will be the application system built-in to the system that will bridge the employer with the prospect employee/apprentice for employment. The details of this framework will also be included in the portal and can be accessed/downloaded by anyone.

The portal will also become a platform for training centre to offer training programmes specific for M&E industry and enable the trainees to select training programmes based on their specific needs.

The system is proposed to be administered by the industry Association with the following justifications:

- Strengthen the role of association in talent development.
- Professionalism. M&E associations established by the companies and expertise in certain areas in M&E's value chan activities. Industrial Skills Framework lead by Industry Association. Thus, Industry Association has the ability to fully utilize all the available inputs from the report and put into action.
- Reduce the cost of system maintenance and administration.
- Industry serving industry and it is guided by the responsible agencies for M&E.
- Result oriented. The association is required to achieve KPI target agreed by both parties.

4.2 CONCLUSION

The Industrial Skills Framework is a document developed with a purpose to provide guidelines on the overall human capital development requirement for the M&E industry. It is hoped that the result of this framework will be used as reference to fulfil the future of developing skilled personnel and certifying Malaysians in this sector towards improving the quality of the local sector and thus spurring Malaysia's global competitiveness.

REFERENCE

Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 1

Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 42

Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 38

International Labour Organization. 2018. Labour force (2019, 30 September) Retrieved from https://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/WCMS_470304/lang--en/index.htm

Department of Statistics Malaysia. 2019. The Labour Force Survey Report 2018. Page 12

Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 14

Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 33

Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 39

Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 45

Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 51

Department of Statistic Malaysia (DOSM). (2018). Annual Economic Statistic 2018.

Ministry of International Trade and Industry (MITI). (2018). Industry4wrd: National Policy on Industry 4.0. Retrieved from https://www.miti.gov.my/miti/resources/National%20Policy%20on%20Industry%204.0/Industry4WRD_Final.pdf

ANNEX 1
LIST OF CONTRIBUTORS

LIST OF CONTRIBUTORS FOR THE MACHINERY & EQUIPMENT SECTOR SKILLS FRAMEWORK DEVELOPMENT

NO	NAME	ORGANISATION
1	Mr. Gangga Sinaran Maqnikham	Muhibbah Engineering Sdn Bhd
2	Mr. Erik Selvanayagam Velu	SMC Automation Sdn Bhd
3	Mr. Mohammad Amin bin Yahya	FES Equipment Services Sdn Bhd
4	Mr. Chan Chee Tatt	Favelle Favco Cranes (Malaysia) Sdn Bhd
5	Mr. Zawawi Bin Hj. Effandi	Tuvnord (Malaysia) Sdn Bhd
6	Mr. Lai Yit Kean	OMRON Malaysia Sdn Bhd
7	Mr. Mohd Zabri Bin Zakaria	KUKA Robot Automation (Malaysia) Sdn Bhd
8	Mr. Mat Arif Bin Idris	SKF Bearing Industry (Malaysia) Sdn Bhd
9	Ms. Zuriani Binti Usop	Machinery Technology Centre SIRIM Berhad
10	Ms. Siti Hasmah Binti Ismail	CEO Office, Standard Training Consultancy (STC), SIRIM Berhad
11	Mr. Jason Cheah Kuen Liang	RSI Automation (M) Sdn Bhd
12	Mr. Woo Ah Keong	Master Jaya Environmental Sdn Bhd
13	Ms. Carol Ong Kim Hong	WEG South East Asia Sdn Bhd
14	Mr. Muhammad Fauzan Bin Yusoff	Destini Group Berhad (Destini Shipbuilding & Engineering Sdn Bhd)
15	Mr. Mohd Syahrill Anuar Bin Hasan	OGPC SDN BHD (A Member of DNeX Group)
16	Mr. Osman Bin Hj Isa	Department of Safety and Health (DoSH) Selangor
17	Ms. Nursyazwani Binti Zulhaimi	Talent Corporation Malaysia Berhad (TalentCorp)

LIST OF CONTRIBUTORS FOR THE MACHINERY & EQUIPMENT SECTOR SKILLS FRAMEWORK DEVELOPMENT

NO	NAME	ORGANISATION
18	Mr. Muhammad Razif Bin Saidun	ABB Malaysia Sdn Bhd
19	Mr. Mohd Noorizwan Bin Nordin	Department of Safety and Health (DOSH) Selangor
20	Mr. Zainuddin Bin Timin	SIRIM Berhad
21	Mr. Mohd Adzraus Bin Mohd Johar	Sapura Machining Corporation Sdn Bhd
22	Y.M Tengku Mohd Farid Bin Tengku Hassim	TXMR SdnBhd
23	Mr. Chia Chin Wee	DF Automation & Robotics Sdn Bhd
24	Mr. Zuhaili Bin Mohd Rodzi	Integrasi Erat Sdn Bhd
25	Mr. Fairurizam Bin Kasmuri	KNM Group Berhad
26	Mr. Haslimy Bin Yaakob	Autokeen Sdn Bhd

LIST OF VERIFIERS FOR SKILL FRAMEWORK DEVELOPMENT

NO	NAME	ORGANISATION
1	Mr. Tiong Khe Hock	OMRON Malaysia Sdn Bhd
2	Mr. Jaafar Bin Baidi	Machinery and Equipment Manufacturers of Association (MEMA)
3	Mr. Ricky Soo	RS Advisory Sdn. Bhd.
4	Mr. Raja Ratnam A.	Tech Terrain College (TTC)
5	Mr. Keeran Raaj	Tech Terrain College (TTC)
6	Ms. Sasha Ratnam	Tech Terrain College (TTC)
7	Ts. Dr. Muhamad Farid Bin Daud	German-Malaysian Institute (GMI)
8	Ms. Aminah Binti Mohd. Taib	Muhibbah Engineering (M) Bhd
9	Datuk Mohamad Saleh Bin Ghazali	Micromagna Machinery Sdn. Bhd

LIST OF WORKFORCE TEAM FOR SKILLS FRAMEWORK DEVELOPMENT

NO	NAME	ORGANISATION
1	Dr. Mazlina Binti Shafi'i	Malaysia Productivity Corporation (MPC)
2	Ms. Halisa Mohamad Halil	Malaysia Productivity Corporation (MPC)
3	Mr. Abdul Rahman Bin Kamis	Malaysia Productivity Corporation (MPC)
4	Ms. Nurul Alia Rahim Omar	Malaysia Productivity Corporation (MPC)
5	Mr. Poobalan A/L Murugesan	Human Resources Development Fund (HRDF)
6	Mr. Mohd Amin Bin Haron	Department of Skills Development (DSD)
7	Mr. Fahiszam Bin Saad	IWM Group Resources
8	Ms. Norfadilah Binti Ithnin	IWM Group Resources
9	Mr. Chan Chee Tatt	Favelle Favco Cranes (M) Sdn. Bhd.

ANNEX 2
JOB DESCRIPTION TABLE

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

MECHANICAL ENGINEER

JOB SUMMARY: Mechanical Engineers play an important role in the M&E industries. He/She designs, develops, builds, and maintains all sorts of mechanical devices, tools, engines and machines. He/She are able to design, manufacture and maintain everything from small parts like miniature connectors to large machine tools like drill presses. He/She takes a product from start to finish, and designs for aesthetics, functionality, and durability.

Related Occupational Title(s): Process Engineer, Industrial Engineer, Pneumatics Engineer, Hydraulics Engineer, Mechatronics Engineer, Automation Engineer and Robotic Operation Engineer.

Salary Range: RM3, 000 – RM6, 000

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Mechanical Design	• Determine regulatory and authority body compliance requirement • Prepare and validate quality management requirement • Prepare and evaluate product conceptual design modelling • Carry out design engineering analysis • Prepare design specification • Produce BOM list	• Geometrical Dimensioning and Tolerancing (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Machining Process • Mechanical Properties • Chemical Composition • Ergonomics and Aesthetics Value • Industry 4.0 (i4.0) - Big Data Analytics - Artificial Intelligence
	Product Prototyping	• Carry out design fabrication and assembly • Perform testing and commissioning of product design (NDT & DT) • Execute fine tuning and optimisation for product design • Produce final product prototyping	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
	Product Documentation Management	• Perform product prototype documentation management including user manual, operating manual and maintenance manual • Provide relevant information and documentation for other parties	-System Integration -Additive Manufacturing -Internet of Things -Cybersecurity -Cloud computing -Augmented Reality -Autonomous Robot -Advanced Materials -Simulation

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Production Planning	• Prepare and evaluate product specification including material specification, BOM list and design drawing • Determine machine operation requirements and machining process • Carry out resources planning for production requirements including for method, manpower and machinery & equipment	• Machining Process • Overall Equipment Effectiveness (OEE) • Statistical Process Control (SPC) • Autonomous Maintenance • Root cause analysis • Engineering Design • Total Quality Management (TQM) • Quality Management System (QMS)
	Product Fabrication	• Carry out machine parameter setting according to product specification • Carry out machining activities	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
		• Coordinate CNC machine operation • Plan and oversee product fabrication operation including cutting, forming and joining • Oversee heat treatment for the product • Monitor and verify product finishing method including for sand blasting or painting and coating	-Lean Manufacturing • Industry 4.0 (i4.0) - Big Data Analytics - Artificial Intelligence - System Integration - Additive Manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality - Autonomous Robot - Advanced Materials - Simulation
	Quality Inspection	• Inspect fabricated product quality • Coordinate inspection test	
	Process Improvement	• Ensure process flow running smoothly • Identify process improvement requirement • Conduct Overall Equipment Effectiveness (OEE) analysis	
	Product Assembly	• Determine subpart and final product assembly process flow including laser marking, bar coding, heat number and color marking • Perform product functionality test, including component / subpart functionality test • Determine product packaging requirement	
	Product Testing and Commissioning	• Carry out Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) based on determined requirements	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	System Operation	• Perform and monitor Automation System Operation and Control • Plan and evaluate production preparation process • Perform troubleshooting on system operation	• Geometrical Dimensioning and Tolerancing (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Machining Process • Mechanical Properties • Ergonomics and Aesthetics Value • Industry 4.0 (i4.0) - Big Data Analytics - Artificial Intelligence - System Integration - Additive Manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality - Autonomous Robot - Advanced Materials - Simulation • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSOC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC)
	Robot Design	• Prepare and evaluate robot mechanical, electrical and electronics • Produce robot modelling design • Produce Electrical & Electronic Circuit Design and Electrical & Electronic Layout and Wiring Diagram Design • Carry out engineering, electrical and electronic system analysis • Produce design specification • Produce BOM list • Carry out product prototyping • Compile and collate design documentation	
	Robotic Programming	• Perform autonomous module robotic programming • Develop human machine interface (HMI) • Execute robotic system programme integration • Perform verification of robotic system programme development • Carry out robotic system calibration • Perform robotic motion programming • Perform robotic vision programming • Perform robotic special function programming	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
		• Carry out robotic peripherals program integration	• Networking and Communication Protocol - Wired & Wireless • Sensing and Control - Instrumentation - Vision system • Cybersecurity
Automation System Engineering	Automation & Robotic System Integration	• Analyze automation and robotic system integration requirements • Perform automation and robotic system integration	• Lean Manufacturing • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Instrumentation and Control
	Automation System Support	• Perform automation system troubleshooting • Plan and monitor system maintenance which includes preventive maintenance, corrective maintenance and predictive maintenance	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

MANAGERIAL COMPETENCY FOR MECHANICAL ENGINEER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentation to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personal Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

MECHANICAL TECHNICIAN

JOB SUMMARY: Mechanical Technician's primary focus is performing maintenance, service and repair of facilities, machineries and equipment. He/She should be involved in providing a cost estimation of projects, preparing layouts and drawings of parts, reviewing blueprints or assembling parts and equipment. He/She also performs tests on a finished product according to manufacturer's manual and organisation Standard Operating Procedure.

Related Occupational Title(s): R&D Mechanical Technician, Industrial Mechanical Technician, Machine Operator, Machinist.

Salary Range: RM1,500 – RM3,000

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Design Support Operation	• Assist in the generation and review of formal test protocols and reports • Assist in the execution of test protocols, methods and procedures. • Set up and operate test equipment and records measurements • Maintain accurate, organizes and presents data in a reportable format • Assist in the generation, design and troubleshooting of testing fixtures	• Machining Process • Mechanical Properties • Chemical Composition • Product Testing Method - Non-Destructive Testing (NDT) - Destructive Testing (DT)
	Product Prototyping	• Assist in design fabrication and assembly activities • Provide technical support for testing and commissioning of product design (NDT & DT) • Assist in fine tuning and optimisation for product design	
	Product Documentation Management	• Record and compile product prototype documentation management product testing and commissioning data.	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Production Operation Support and Maintenance	• Troubleshoot machine faults • Perform machine setup • Carry out machine maintenance activities including preventive, corrective and predictive maintenance	• Machining Process • Statistical Process Control (SPC) • Maintenance Operation - Preventive - Corrective - Predictive • Machine Load Balancing • Computer Numerical Control Programming • Types of product inspection method - Non-Destructive Testing (NDT) - Destructive Testing (DT)
	Product Fabrication Operation	• Carry out machine parameter setting according to product specification • Carry out machining activities • Carry out CNC machine operation • Handle product fabrication operation including cutting, forming and joining • Carry out heat treatment for product • Check product finishing method	
	Quality Inspection Activities	• Perform product functionality testing • Carry out production process quality inspection	
	Process Improvement	• Provide support for machine optimisation activities • Provide support for process improvement activities • Provide support in production process improvement	
	Product Assembly	• Identify subpart and final product assembly process flow • Perform product functionality test including component / subpart functionality test • Identify product packaging requirement	
	Product Testing and Commissioning	• Provide support for FAT and SAT activities	

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: QUALITY MANAGEMENT			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Quality Control	Quality Control Operation	• Perform final inspection • Perform visual inspection on optical parts. • Perform dimensional measurements • Identify and report systematic and preventable non-conformance occurrences. • Reject defective product and document through the company reporting process	• Procedure of quality control inspection • Product testing methodology • Statistical Process Control (SPC) • Interpretation of product design specification • Root cause analysis • Engineering Design - Basic of Total Quality Management (TQM)

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	Robotic System Installation, Maintenance and Operation	• Carry out new robotic systems fabrication and installation • Modify computer-controlled robot movements. • Build or assemble robotic devices or systems. • Develop robotic path motions to maximise efficiency, safety, and quality. • Attach wires between controllers. • Assist engineers in design, configuration, or application of robotic systems.	• Geometrical Dimensioning and Tolerancing (GD&T) • Mechanical Properties - PLC and Micro Controller Programming

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

JOB AREA: QUALITY MANAGEMENT			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
		• Perform preventive or corrective maintenance on robotic systems or components. • Install, programme, or repair programmable controllers, robot controllers, end-of-arm tools, or conveyors. • Evaluate efficiency and reliability of industrial robotic system • Operate robots to perform customised tasks	
Automation System Engineering	Mechanical System Maintenance	• Perform automation system equipment and operating system inspection • Resolve motor, pump, conveyor, pneumatic and hydraulic issues. • Repair and perform maintenance as per established standards.	• Automation system operation • Geometrical Dimensioning and Tolerancing (GD&T) • Mechanical Properties • PLC and Micro Controller Programming

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

SUPERVISORY COMPETENCY FOR MECHANICAL TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Report writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience
Project Management	• Conduct project after-action review
Project Management	• Conduct project after-action review

JOB DESCRIPTION TABLE FOR MECHANICAL ENGINEER & MECHANICAL TECHNICIAN

SUPERVISORY COMPETENCY FOR MECHANICAL TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
	• Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

ELECTRICAL ENGINEER

JOB SUMMARY: Electrical Engineers play an important role in the M&E industries. He/She designs, develops, and tests electrical devices and equipment, including communications systems, power generators, motors and navigation systems, and electrical systems. He/She also oversees the manufacture of these devices, systems, and equipment. He/She applies the principles of electricity, electronics, and electromagnetism to develop electrical products and systems. He/She performs risk assessments and ensures compliance with safety standards and electrical engineering codes. He/She also conducts research to create new applications.

Related Occupational Title(s): Process Engineer, Industrial Engineer, Pneumatics Engineer, Hydraulics Engineer, Mechatronics Engineer, Automation Engineer and Robotic Operation Engineer.

Salary Range: RM3,000 – RM7,700

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**

Research & Development (R&D)	Electrical Design	• Prepare electrical design specification
		• Perform electrical system analysis
		• Carry out electrical system simulation
		• Prepare and analyse electrical layout and wiring diagram design
		  - Electrical Schematic Diagram
		  - Electrical Component Layout Diagram
		  - Control panel layout diagram
		  - Electrical wiring diagram
		• Conceptual Design
		• Prepare design specification requirement
		• Identify and manage regulatory and authority body compliance requirement
			• Lean manufacturing
			• Power management
			• Ingress Protection (IP) Rating
			• Electrical load calculation and component selection
			• Compliance standard and power consumption for electrical component
			• Power protection system and grounding
			• Risk assessment method

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
	Electrical System Testing and Commissioning	• Perform fine tuning and optimisation • Carry out power loading analysis • Execute Electrical Panel Missouri Educator Gateway Assessments (MEGA) Test • Perform Earth Leakages Testing	
	Product Documentation Management	• Perform product prototype documentation management including user manual, operating manual and maintenance manual for an electrical system • Provide relevant information and documentation for other parties	

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation	• Carry out machine parameter setting according to product specification • Subpart and final product assembly for electrical component • Perform functional test on electrical components and subparts	• Machining Process • Overall Equipment Effectiveness (OEE) • Autonomous Maintenance • Root cause analysis • Engineering Design • Total Quality Management (TQM) - Quality Management System (QMS) - Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma • Numerical Control
	Product Testing and Commissioning	• Carry out Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) based on determined requirements	

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Automation System Engineering	Electrical Automation System Operation	• Perform automation system operations and control • Carry out production preparation process • Perform automation and robotic system integration of electrical components • Perform electrical system troubleshooting on the automation system • Plan and perform electrical system maintenance including predictive, corrective and predictive maintenance activities	• Geometrical Dimensioning and Tolerancing (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Machining Process • Mechanical Properties • Chemical Composition • Ergonomics and Aesthetics Value

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

MANAGERIAL COMPETENCY FOR ELECTRICAL ENGINNER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personnel Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence in managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

ELECTRICAL TECHNICIAN

JOB SUMMARY: Electrical Technicians help create, maintain and repair the electronic components and equipment used in any equipment or device that involves electricity. He/She can sometimes work with electricians or electrical engineers, or work on site to keep machinery and specialty equipment running correctly. He/She may use specialized measuring and diagnostic devices to evaluate how electrical equipment is working, building or calibrating instrumentation, build electronic devices based on reading schematics, inspect for problems, replace old equipment and install new equipment.

Related Occupational Title(s): R&D Electrical Technician, Industrial ELectrical Technician, Electrician.

Salary Range: RM1,200 – RM3,500

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Design Support Operation	• Interpret design drawing • Prepare installation, maintenance and inspection tools and equipment • Identify electrical component specification • Carry out assembly of electrical component. • Carry out cable laying as per diagram • Assist in testing activities for an electrical system • Conduct functionality test for electrical system • Carry out electrical system preventive and corrective for machine and equipment maintenance • Carry out machine parameter setting	• Machining Process • Electrical Wiring • Electrical Power • Electrical Measuring instrument • Interpretation of Wiring Circuit Diagram
	Product Prototyping	• Assist in electrical system design and assembly activities • Provide technical support for electrical system testing and commissioning of product design • Assist in fine tuning and optimisation for product design	
	Product Documentation Management	• Record and compile product prototype documentation management product testing and commissioning data.	

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Electrical System, Operation Support and Maintenance	• Perform electrical system setup for machine operation • Carry out machine maintenance activities including preventive, corrective and predictive maintenance • Troubleshoot faulty electrical machines	• Maintenance procedures for electrical system • Occupational Safety and Health Compliance Requirement • Related statutory and regulatory compliance requirement on electrical • Interpretation of design drawing • Cable laying procedure • Cable arrangement • Electrical component specification • Types and functions of electrical component
	Product Fabrication Operation	• Carry out cable laying as per diagram • Carry out assembly of electrical components • Carry out electrical system preventive and corrective maintenance for machine and equipment • Carry out machine parameter setting • Record machine operation checklist • Prepare machine operation report • Conduct functionality test for electrical system • Assist in testing activities of an electrical system • Identify electrical component specification • Prepare installation, maintenance and inspection tools and equipment • Interpret design drawing	
	Quality Inspection Activities	• Product functionality testing • Carry out production process quality inspection	
	Product Testing and Commissioning	• Provide support for FAT and SAT activities of an electrical system	

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	Robotic System Installation, Maintenance and Operation	• Interpret design drawing • Prepare installation, maintenance and inspection tools and equipment • Identify electrical component specification • Carry out assembly of electrical components. • Carry out cable laying as per diagram • Assist in testing activities of an electrical system • Conduct functionality test of electrical system • Carry out electrical system preventive and corrective for machine and equipment maintenance • Carry out machine parameter setting	• Robotic system engineering • SI System of Units • AC and DC current • Electrical and Electronic Symbols • Basic electrical concepts and terms - Electrical voltage. - Electrical current. - Electrical resistance - Electric power. - Electric charge. - Power efficiency. - Power factor.
Automation System Engineering	System Maintenance	• Inspect and test electrical component of the automation system • Read blueprints and vendor instructions to determine repair procedures • Remove, repair, or replace defective electrical components • Design, draw, assemble and install electrical components. • Troubleshoot electrica system issues • Maintain safety warning postings and identification tags on equipment.	• Automation system operation • Maintenance procedure for electrical system • Occupational Safety and Health Compliance Requirement • Related statutory and regulatory compliance requirement • Interpretation of design drawing • Cable laying procedure • Cable arrangement • Electrical component specification • Types and functions of electrical component • PLC and Micro Controller Programming

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

SUPERVISORY COMPETENCY FOR ELECTRICAL TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Report writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personnel Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR ELECTRICAL ENGINEER & ELECTRICAL TECHNICIAN

SUPERVISORY COMPETENCY FOR ELECTRICAL TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

ELECTRONICS ENGINEER

JOB SUMMARY: Electronics Engineer plays an important role in the M&E industries. He/She designs, develops, tests, or supervises the manufacturing and installation of electronic equipment, components, or systems for commercial, industrial, or scientific use. He/She can specialise in the field, with areas of expertise including audio, visual and light electronic equipment; control systems and automation; and microelectronics (computer chips) and telecommunications.

Related Occupational Title(s): Electronics Engineer, Control System Engineer, Robotic System Design Engineer and Robot Designer.

Salary Range:RM3,000 – RM7,000

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Electronic Circuit Design	• Prepare electronic circuit design specification requirement - Regulatory and Authority Body Compliance Requirement - Quality Management • Carry out electrical system simulation • Prepare and analyse electrical layout and wiring diagram design - Electrical Schematic Diagram - Electrical Component Layout Diagram - Control panel layout diagram - Electrical wiring diagram • Produce conceptual design • Perform design analysis • Perform engineering analysis • Produce BOM list	• Lean Manufacturing • Circuit Theory - Analogue circuit - Digital circuit • Electronic Component Selection • Machining Process • Ingress Protection rating (IP rating) • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC)

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
	Product Prototyping	• Carry out Printed Circuit Board (PCB) Fabrication • Perform electronic component assembly • Carry out embedded system programming	• Networking and Communication Protocol - Serial communication - EtherCAT - Modbus - CAN bus • Instrumentation and Control
	Electrical System Testing and Commissioning	• Perform fine tuning and optimisation • Carry out functionality test • Carry out Electro-Magnetic Pulse (EMP) testing • Carry out Electro-Magnetic Interference (EMI) testing • Carry out Electro-Magnetic Compatibility (EMC) testing	
	Product Documentation Management	• Perform product prototype documentation management including user manual, operating manual and maintenance manual of an electrical system • Provide relevant information and documentation for other parties	

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation	• Carry out machine parameter setting according to product specification • Setup machine instrumentation and control signal functioning • Prepare maintenance operation planning • Perform machine troubleshooting for electronic faulty	• Sensoring and Image Processing • Circuit Diagram • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Total Quality Management (TQM) • Quality Management System (QMS) • Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma • Root cause analysis • Autonomous Maintenance
	Product Testing and Commissioning	• Carry out Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) based on determined requirements	

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Automation System Engineering	Electronic System Operation	• Perform automation system operations and control • Perform automation and robotic system integration for electronic and control system component • Perform electronic and control system troubleshooting on the automation system • Plan and perform electronic and control system maintenance including predictive, corrective and predictive maintenance activities	• Lean Manufacturing • Circuit Theory - Analogue circuit - Digital circuit • Electronic Component Selection • Machining Process • Ingress Protection rating (IP rating) • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CAN bus • Instrumentation and Control

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

MANAGERIAL COMPETENCY FOR ELECTRONICS ENGINEER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functional and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personnel Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

ELECTRONICS TECHNICIAN

JOB SUMMARY: An industrial Electronics Technician is responsible for maintaining, troubleshooting, and repairing electronic components of the M&E in factories or other industrial facilities. He/She may be responsible for installing, inspecting, and improving the efficiency in equipment as well. He/She may inspect and maintain existing equipment using similar tools, such as voltmeters and PC-based diagnostic software which require analysing and troubleshooting of complex problems. Electronics Technicians may also replace existing equipment based on age, operation, and functionality.

Related Occupational Title(s): R&D Control System Technician, Industrial Electronics Technician and Electronics Technician.

Salary Range:RM1,200 – RM3,000

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Design Support Operation	• Interpret design drawing • Prepare installation, maintenance and inspection tools and equipment • Identify electronic component specification • Carry out assembly of electronic and control system components. • Carry out cable laying as per diagram • Assist in testing activities for electronic and control system • Conduct functionality test for electronic and control system • Carry out electronic and control system preventive and corrective for machine and equipment maintenance • Carry out machine parameter setting	• Wireless • Sensoring and Image Processing • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of Circuit Diagram • Circuit Diagram • Machining Process • Electronic Measuring instrument
	Product Prototyping	• Assist in electronic and control system design and assembly activities • Provide technical support for electronic and control system testing and commissioning on product design • Assist in fine tuning and optimisation for product design	
	Product Documentation Management	• Record and compile product prototype documentation management product testing and commissioning data.	

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Electronic System, Operation Support and Maintenance	• Perform electronic and control system system setup for machine operation • Carry out machine maintenance activities including for preventive, corrective and predictive maintenance • Troubleshoot electronic and control system machine faulty	• Engineering design • Maintenance procedures for electronic and control system • Occupational Safety and Health Compliance Requirement • Interpretation of circuit design drawing • Electronic component specification • Types and functions of electronic and control system component
	Product Fabrication Operation	• Carry out electronic and control system installation as per manual • Carry out assembly of electrical components. • Carry out electronic and control system preventive and corrective for machine and equipment maintenance • Carry out machine parameter setting • Record machine operation checklist • Prepare machine operation report • Conduct functionality test for electronic and control system • Assist in testing activities for electronic and control system • Prepare installation, maintenance and inspection tools and equipment • Interpret electronic circuit design drawing	
	Quality Inspection Activities	• Product functionality testing • Carry out production process quality inspection	
	Product Testing and Commissioning	• Provide support for FAT and SAT activities for product electrical system	

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	Robotic System Installation, Maintenance and Operation	• Interpret electronic circuit design drawing • Prepare installation, maintenance and inspection tools and equipment • Identify electronic and control system component specification • Carry out assembly of electronic and control system components • Carry out equipment installation as per drawing • Assist in testing activities for electronic and control system • Conduct functionality test for electronic and control system • Carry out electronic and control system preventive and corrective for robotic system maintenance	• Wireless • Sensoring and Image Processing • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of Circuit Diagram • Circuit Diagram • Machining Process • Electronic Measuring instrument • PLC and Micro Controller Programming
Automation System Engineering	System Maintenance	• Inspect and test electrical component on the automation system • Read blueprints and vendor instructions to determine repair procedures. • Remove, repair, or replace defective electrical components • Design, draw, assemble and install electrical components. • Troubleshoot electrical system issues • Maintain safety warning postings and identification tags on equipment.	

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

SUPERVISORY COMPETENCY FOR ELECTRONICS TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personnel Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR ELECTRONICS ENGINEER & ELECTRONICS TECHNICIAN

SUPERVISORY COMPETENCY FOR ELECTRONIC TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

MECHATRONIC ENGINEER

JOB SUMMARY: Mechatronics Engineer works in all aspects of the development of the smart machine from design and testing to manufacture robotics and manufacturing industries. He/She is responsible to research, design, develop, or test automation involving intelligent systems, smart devices, or industrial systems control.

Related Occupational Title(s): Automation Engineer, Control System Engineer, Instrumentation Engineer, Systems Engineer, Service Engineer and Associate Engineer.

Salary Range: RM3, 000 – RM5, 000

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Mechanical System Design	• Prepare mechanical system design specification requirement - Regulatory and Authority Body Compliance Requirement - Quality Management • Carry out mechanical system simulation • Produce conceptual design • Perform design analysis • Electro mechanical system design - Power train - Hydraulics - Pneumatics • Perform engineering analysis • Produce BOM list	• Instrumentation and Control • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CAN bus • Embedded system programming - Micro Controller - PLC • Programmable System on Chip (PSoC) • Field Programmable Gate Array (FPGA) • Single Board Computer (SBC) / Industrial Personal Computer (IPC)

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
	Electrical & Electronic System Design	• Perform engineering analysis • Perform fine tuning and optimisation • Carry out power loading analysis • Prepare electrical & electronic layout and wiring diagram design - Electrical & electronic schematic diagram - Electrical & electronic component layout diagram - Control panel layout diagram - Electrical wiring diagram • Produce BOM list	• Electronic Component Selection • Ingress Protection rating (IP rating) • Machining Process • Finite Element Analysis (FEA) • Digital circuit • Analogue circuit • Ergonomics and Aesthetics Value • Chemical Composition • Mechanical Properties • Lean Manufacturing • Geometrical Dimensioning and Tolerancing (GD&T)
	Product Prototyping	• Carry out design fabrication and assembly • Perform testing and commissioning on product design (NDT & DT) • Execute fine tuning and optimisation for product design • Produce final product prototyping	
	Electrical System Testing and Commissioning	• Perform fine tuning and optimisation • Carry out functionality test • Carry out electrical system testing - Carry out Electrical Panel Missouri Educator Gateway Assessments (MEGA) Test - Earth Leakages Testing - Electro-Magnetic Pulse (EMP) testing - Electro-Magnetic Interference (EMI) testing - Electro-Magnetic Compatibility (EMC) testing	
	Product Documentation Management	• Perform product prototype documentation management including user manuals, operating manual and maintenance manual for electrical system • Provide relevant information and documentation to other parties	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation	• Carry out machine parameter setting according to product secification • Prepare product planning • Carry out machining activities • Carry out fabrication activities • Analyse process improvement analysis and fine tuning requirement • Prepare maintenance operation planning • Perform machine troubleshooting	• Sensoring and Image Processing • Circuit Diagram • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Total Quality Management (TQM) • Quality Management System (QMS) • Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma • Engineering Design • Root cause analysis • Autonomous Maintenance • Statistical Process Control (SPC) • Overall Equipment Effectiveness (OEE) • Machining Process
	Product Testing and Commissioning	• Carry out Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) based on determined requirements	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	Robotic Mechanical System Design and Operation	• Prepare robotic mechanical system design specification requirement • Regulatory and Authority Body Compliance Requirement • Quality Management • Carry out robotic mechanical system simulation • Perform design analysis • Perform electro mechanical system design for robotic system • Power train • Hydraulics • Pneumatic • Perform engineering analysis • Perform fine tuning and optimisation • Produce BOM list	• Instrumentation and Control • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CAN bus • Embedded system programming • - Micro Controller • - PLC • Programmable System on Chip (PSoC) • Field Programmable Gate Array (FPGA) • Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Electronic component selection • Ingress Protection rating (IP rating) • Machining Process • Finite Element Analysis (FEA) • Digital circuit • Analogue circuit • Ergonomics and Aesthetic Value • Chemical Composition • Mechanical Properties • Lean Manufacturing • Geometrical Dimensioning and Tolerancing (GD&T)
	Robotic Electrical & Electronic System Design and Operation	• Perform fine tuning and optimisation • Carry out power loading • Prepare electrical & electronic layout and wiring diagram design - Electrical & electronic schematic diagram - Electrical & electronic component layout diagram - Control panel layout diagram - Electrical wiring diagram • Produce BOM list	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Automatic System Engineering	Automation & Robotic System Integration	• Analyse automation and robotic system integration requirements • Perform automation and robotic system integration	• Lean Manufacturing • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Instrumentation and Control
	Automation System Operation	• Perform automation system troubleshooting • Plan and monitor system maintenance which include preventive maintenance, corrective maintenance and	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

MANAGERIAL COMPETENCY FOR MECHATRONICS ENGINEER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personal Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

MECHATRONICS TECHNICIAN

JOB SUMMARY: Mechatronics Technician is responsible for assisting design, development and engineering staff, as well as working with mechatronics tradespeople to install, maintain, modify and repair mechatronic systems, equipment and component parts. He/She may also carry out fitting and assembling parts and sub-assemblies, inspecting equipment on site, examining drawings or specifications, and also checking accuracy and quality of finished parts, tools or sub-assemblies.

Related Occupational Title(s): R&D Control System Technician, Industrial Electronics Technician, Electronics Technician

Pre-requisites: Not Available

Salary Range: RM1,500 – RM3,500

JOB AREA: MACHINERY & EQUIPMENT (M&E) DESIGN			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Research & Development (R&D)	Design Support Operation	• Assist in the generation and review of formal test protocols and reports • Assist in the execution of test protocols, methods and procedures. • Set up and operate test equipment and records measurements • Maintain accurate, organizes and presents data in a reportable format • Experience with vision systems and metrology hardware/Software • Assist in the generation, design and troubleshooting of testing fixtures	• Machining Process • Mechanical Properties • Chemical Composition • Product Testing Method - Non-Destructive Testing (NDT) - Destructive Testing (DT)
	Product Prototyping	• Assist in design fabrication and assembly activities • Provide technical support for testing and commissioning on product design (NDT & DT) • Assist in fine tuning and optimisation for product design	
	Product Documentation Management	• Record and compile product prototype documentation management product testing and commissioning data.	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: M&E ASSEMBLY, TESTING AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
M&E Assembly, Testing and Repair	Electronic System, Operation Support and Maintenance	• Troubleshoot machine faults • Perform machine setup • Carry out machine maintenance activities including for preventive, corrective and predictive maintenance	• Machining Process • Statistical Process Control (SPC) • Maintenance Operation - Preventive - Corrective - Predictive • Machine Load Balancing • Computer Numerical Control Programming • Types of product inspection method - Non-Destructive Testing (NDT) - Destructive Testing (DT)
	Product Fabrication Operation	• Carry out machine parameter setting according to product specification • Carry out machining activities • Carry out CNC machine operation • Handle product fabrication operation including cutting, forming and joining • Carry out heat treatment for product • Check product finishing method	
	Quality Inspection Activities	• Perform product functionality testing • Carry out production process quality inspection	
	Product Testing and Commissioning	• Provide support for FAT and SAT activities for product electrical system	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

JOB AREA: INDUSTRIAL AUTOMATION ENGINEERING			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Robotic Engineering	Robotic System Installation, Maintenance and Operation	• Carry out new robotic systems fabrication and installation • Modify computer-controlled robot movements. • Build or assemble robotic devices or systems. • Develop robotic path motions to maximise efficiency, safety, and quality. • Attach wires between controllers. • Assist engineers in design, configuration, or application of robotic systems. • Perform preventive or corrective maintenance on robotic systems or components. • Install, programme, or repair programmable controllers, robot controllers, end-of-arm tools, or conveyors. • Evaluate efficiency and reliability of industrial robotic system • Operate robots to perform customised tasks	• Sensoring and Image Processing • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of engineering drawing • Interpretation of Circuit Diagram • Interpretation of Wiring Circuit Diagram • Machining Process • Automation system operation
Automation System Engineering	Mechatronic System Maintenance	• Perform automation system equipment and operating system inspection • Repair and perform maintenance as per established standards.	

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

SUPERVISORY COMPETENCY FOR MECHATRONICS TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concept • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Report writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR MECHATRONICS ENGINEER & MECHATRONICS TECHNICIAN

SUPERVISORY COMPETENCY FOR MECHATRONIC TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

METAL MACHINING ENGINEER

JOB SUMMARY: Metal Machining Engineer is responsible to determine product specification, plan machining operation. He/She is also required to maintain a centralized program database and detailed records on all CNC machines operation.

Related Occupational Title(s): Metal Machining Engineer and Metal Machining Specialist

Salary Range: RM3,500 – RM7,000

M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Machining & Special Tooling	Machine Operation Planning and Monitoring	• Plan, design, purchase, and implement machining processes and equipment • Determine parts and tools for product manufacturing. • Design, develop, implement, and analyze technical products and systems. • Perform equipment engineering design evaluations • Carry out equipment availability and capability • Develop machine and equipment operation and maintenance SOP • Setup reduction and changeovers according to product specification • Recommend alterations to development and design • Prepare project costing • Develop CNC program for machine operation	• Overall Equipment Effectiveness (OEE) • Total Quality Management (TQM) • People management • Resources planning • Strategic planning • SOP and method of statement preparation • CNC Programing • Risk assessment • Office management • Purchasing procedure • Project costing

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

MANAGERIAL COMPETENCY FOR METAL MACHINING ENGINEER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personnel Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

MACHINIST & CNC MACHINIST

JOB SUMMARY: A Machinist's job is to assemble or fabricate mechanical parts, pieces or products using a variety of tools and equipment according to specification. He/She usually specialises either in CNC or convensional machine. He/She are also reviews samples, drawings or instructions, plan process sequence and takes measurements and marks material for cutting or shaping.

Related Occupational Title(s): Machine Operator, Machinist, CNC Machinist

Salary Range: RM1,500 – RM3,500

M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Machining & Special Tooling	Machining Operation	• Setup material on machine • Set up tools and equipment on machine • Setup jigs and fixtures • Carry out material preparation • Carry out machine calibration • Perform machine setup • Perform consumable tools replacement • Prepare machine performance Report • Perform machine maintenance requirement • Carry out Statistical Process Control (SPC)	• Interpretation of Engineering Drawing • Geometrical Dimensioning and Tolerancing (GD&T) • Machine Operation - Operation manual - Maintenance manual • Safety instruction • Measuring instrument • Statistical Process Control (SPC) • CNC machine operation • Numerical control
	CNC Machining Operation	• Prepare and operate CNC machines to perform tasks such as drilling, grinding, milling etc. • Determine product specifications • Interpret blueprints and mechanical drawings. • Translate instructions into computer commands • Prepare and load raw materials and parts onto machines • Produce test run sample • Set machines to complete full cycles • Inspect and measure finished products	

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

SUPERVISORY COMPETENCY FOR MACHINIST & CNC MACHINIST	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

SUPERVISORY COMPETENCY FOR MACHINIST & CNC MACHINIST	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

HEAT TREATMENT METALLURGIST

JOB SUMMARY: Heat Treatment Metallurgist is responsible to develop and manufacture metal items and structures that range from tiny precision-made components to huge engineering parts. He/She is able to work with a range of metals including copper, precious metals, iron, steel, zinc and aluminium alloys.

Related Occupational Title(s): Heat Treatment Engineer

Salary Range: RM3,500 – RM7,000

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Heat Treatment	Heat Treatment Operation	• Implement heat treatment cycle and processes • Oversee equipment operational safety and maintenance • Develop and implement maintaining method for heat treatment process • Liaise with metallurgist and laboratory staff • Carry out cost analysis for forging and heat treatment process • Develop work procedure, process improvement and cost saving recommendation for customer • Provide consultation for material selection and treatment process • Develop product and process design specification of new and existing material. • Perform SAT and uniformity check	• Familiarity with statistical process control method • Site Acceptance Test (SAT) and uniformity check for heat treatment • Basic metallurgy of alloy and gasses • Material selection and treatment process • Root cause analysis • Cost analysis • Heat treatment cycle and process specification • Procedure to develop heat treatment process SOP

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

MANAGERIAL COMPETENCY FOR HEAT TREATMENT METALLURGIST	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personnel Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence in managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

HEAT TREATMENT OPERATOR

JOB SUMMARY: Heat Treatment Operator's primary job function is taking charge of the heat treat processes and monitoring the furnace lines in the heat treat department. He/She is responsible to set up, operate, or tend heating equipment, such as heat-treating furnaces, flame-hardening machines, induction machines, soaking pits, or vacuum equipment to temper, harden, anneal, or heat-treat metal or plastic objects.

Related Occupational Title(s): Process Engineer & Industrial Engineer.

Salary Range: RM1,300 – RM2,500

JOB AREA: M&E FABRICATION, ASSEMBLY AND REPAIR			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Heat Treatment	Heat Treatment Operation Support	• Operate heat treating furnaces following predetermined recipes generated by Metallurgist • Maintain heat number and grade traceability • Observe pre-programmed controls • Prepare surface of rings for hardness testing. • Operate testing equipment for hardness test. • Perform maintenance duties including changing pier blocks in tip-ups, tightening of manipulator chains, and lubricating/oiling equipment as necessary.	• Heat-Treating Processes - Hardening - Tempering - Annealing • Site Acceptance Test (SAT) and uniformity check for heat treatment • Basic metallurgy of alloy and gasses • Material selection and treatment process • Heat treatment cycle and processes specification

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

SUPERVISORY COMPETENCY FOR HEAT TREATMENT OPERATOR	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

SUPERVISORY COMPETENCY FOR HEAT TREATMENT OPERATOR	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

PAINTING & BLASTING ENGINEER

JOB SUMMARY: Painting & Blasting Engineer is responsible to carry analysis on painting surface prior to blasting and painting operation. He/She is also required to determine the surface treatment requirement, quality control criteria and to inspect finish goods quality on painted and cleaned surface area.

Related Occupational Title(s): Painting Engineer

Salary Range: RM2,000 – RM3,500

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Protective Coating	Painting & Blasting	• Analyse paint specifications of the projects and indenting • Evaluate and validate paint quality • Improve paint quality and minimize paint wastage • Determine methodology for surface treatment as per Safety Standards as well as ISO and OSHA standards	• Surface treatment • Protective coating technology • Paint quality inspection

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

MANAGERIAL COMPETENCY FOR PAINTING & BLASTING ENGINEER	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personal Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

PAINTING AND BLASTING TECHNICIAN

JOB SUMMARY: A Painting and Blasting Technician performs all duties in the paint & blast process, such as surface preparation, spray-gun application of liquid coatings, wrapping painted products for shipment, operating heavy equipment to move product around the large pole coating facility and performing abrasive blasting to prepare products for application of liquid coatings. He/she is also responsible for understanding and complying with safety and environmental regulations and policies as pertaining to the painting & blasting procedures.

Related Occupational Title(s): Blasting Technician and Painter

Salary Range: RM1,200 – RM2,500

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Protective Coating	Blasting Operation	• Investigate paint and surface issues • Carry out preparation of blasting activities • Provide recommendation on blasting operation requirements • Carry out blasting operation • Check blasting equipment functionality • Prepare blasting material • Check surface quality	• Surface treatment • Protective coating technology • Paint quality inspection
	Painting Operation	• Investigate paint and surface issues • Coordinate preparation of blasting activities • Provide recommendation on blasting operation requirements • Prepare painting surfaces • Mix, match and apply paints and other finishes to various surfaces • Perform decorative and faux finishes	• Procedure of preparing painting surfaces - Washing walls - Repairing holes - Removing old paint • Types of paint and surface issues • Decorative and faux finishes

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR PAINTING AND BLASTING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operations research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR PAINTING AND BLASTING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

THERMAL SPRAY PAINTER

JOB SUMMARY: A Thermal Spray Painter cleans and paints and varnishes different surface types. He/She is also responsible to carry out surfaces cleaning prior to layering paint and maintaining technical equipment for the job.

Related Occupational Title(s): Spray Painter

Salary Range:RM1,500 – RM2,500

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Protective Coating	Thermal Spray Operation	• Prepare, mask and apply metal spray coatings to rebuild parts. • Operate thermal spray machine. • Perform equipment maintenance, • Perform machines sets up. • Perform spray inspection including combustion, wire arc and thermal spray functions. • Interpret prints and drawings. • Perform thermal spray machine inspection	• Thermal spray machine • Material specification for thermal spray • Thermal spraying procedure • Procedure to intepret

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR THERMAL SPRAY PAINTER	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operation research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR THERMAL SPRAY PAINTER	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

GALVANISING TECHNICIAN

JOB SUMMARY: A Galvanising Technian cleans and paints and varnishes different surface types. He/She is also responsible to carry out surface cleaning prior to layering paint and maintaining technical equipment for the job.

Related Occupational Title(s): Galvanising Supervisor, Galvanising Technician and Galvaniser

Salary Range: RM1,500 – RM2,500

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Protective Coating	Galvanising Operation	• Provide recommendation on galvanising operation requirements • Carry out galvanising operation • Check galvanising equipment functionality • Prepare galvanising material • Check surface quality • Investigate surface issues	• Types of surface defect • Galvanising operation • Galvanising equipment • Types of galvanising material

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR GALVANISING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operations research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR GALVANISING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

PLATING TECHNICIAN

JOB SUMMARY: A Plating Technician's duty is to use a variety of chemical materials, such as copper or nickel, to coat the surface of plastic or metal products/parts. He/She is also responsible to operate the machinery designed to coat the products and monitor the process. He/She is also required to ensure the machinery set-up and calibrations are up to design specifications indicated by engineering or production blueprints.

Related Occupational Title(s): Plating Machine Operator

Salary Range:RM1,500 – RM2,500

JOB AREA: M&E FABRICATION			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDz**
Protective Coating	Plating Operation	• Operate plating line(s) • Perform in-process inspections • Perform chemical maintenance on plating line • Perform chemical additions to bath chemistries • Perform dumping and replenishing bath chemistries • Prepare plating surfaces of all parts • Prepare parts for plating • Improve processes and tooling • Perform routine maintenance on plating system and equipment	• Plating operation • Chemical properties • Maintenance requirements on plating machine and equipment • Surface preparation for plating - Masking - Blasting • Cadmium plating

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR PLATING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions at managerial level • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operations research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

SUPERVISORY COMPETENCY FOR PLATING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

QUALITY MANAGER (QUALITY CONTROL & ASSURANCE)

JOB SUMMARY: Quality Manager plays a crucial role in business by ensuring that products meet certain thresholds of acceptability. He/She plans, directs or coordinates quality assurance programmes and formulate quality control policies. He/She also works to improve an organization's efficiency and profitability by reducing waste. He/She is also responsible to supervise the inspection team which carries out the detailed assessment of products and their components at different stages of production.

Related Occupational Title(s): Quality Control Manager, Quality Assurance Manager and Quality Assurance Manager

Salary Range: RM3,000 – RM8,500

JOB AREA: QUALITY MANAGEMENT			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Quality Control	Quality Control Operation	• Create and maintain the Company's Quality Standards • Develop, implement and maintain the Company's quality documentation, such as quality procedures, reports etc. • Establish, implement and maintain the quality awareness throughout the various departments • Work with cross-functional teams to generate Manufacturing Inspection Test Plans • Inspect to ensure that products and processes comply with requirements by using established engineering techniques • Conduct audits, create audit finding reports and determine proper corrective and preventive actions • Analyse the root causes and implement corrective actions for processes or parts	• Overall Equipment Effectiveness (OEE) • Statistical Process Control (SPC) • Autonomous Maintenance • Root cause analysis • Engineering Design • Total Quality Management (TQM) - Quality Management System (QMS) - Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

JOB AREA: QUALITY MANAGEMENT			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Quality Assurance	Quality Assurance Operation	• Test current products and identify deficiencies • Suggest solutions to product problems identified • Investigate product quality in order to make improvements to achieve better customer satisfaction • Plan, create and manage the overall Quality Planning strategy • Collaborate with the Product Development team to ensure consistent project execution • Identify quality assurance process bottleneck and suggest actions for improvement • Oversee continuous improvement projects • Collect quality data • Identify key KPIs for product quality • Prepare and present reports and metrics to Senior Management	

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

MANAGERIAL COMPETENCY FOR QUALITY MANAGER (QUALITY CONTROL & ASSURANCE)	
SKILLS CATEGORY	**SKILLS**
Analytical, Conceptual and Evaluative	• Apply systems thinking in problem solving and decision making
Business Analytics	• Operationalise analytics models
Business Negotiation	• Manage and direct negotiations
Communication	• Establish and maintain strategic business partner relationships • Conduct presentations to senior management
Design Thinking	• Implement design thinking
Interpersonal	• Manage cross functionally and culturally diverse teams
Project Management	• Establish project feasibility • Establish project scope
Strategy Planning and Implementation	• Understand business management
Personal Management and Development	• Develop personal effectiveness at managerial level • Develop professional image and competence to achieve personal career goals
Leadership and People Management	• Cultivate workplace relationships and diversity • Develop self to maintain professional competence at managerial level • Develop team leaders through capability • Development and coaching • Facilitate innovation and lead team leaders to implement change • Lead team leaders to develop strategies and governance management • Monitor and reward performance across teams to support achievement of results
Workplace Safety and Health	• Evaluate Workplace Safety and Health Systems

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

QUALITY CONTROL INSPECTOR

JOB SUMMARY: A Quality Inspector monitors the quality of incoming and outgoing products or materials for a company. He/She is also responsible in conducting tests, analyzing measurements, and overseeing production processes. He/She works in assembly lines or production departments.

Related Occupational Title(s): Product Inspector, Quality Inspector

Salary Range: RM1,800 – RM3,500

JOB AREA: QUALITY MANAGEMENT			
COMPETENCY AREAS	**SKILLS CATEGORY**	**RELATED SKILLS**	**ENGINEERING FUNDAMENTAL**
Quality Control	Quality Control Operation	• Perform final inspection • Perform visual inspection of optical parts. • Perform dimensional measurements • Identify and report systematic and preventable non-conformance occurrences. • Reject defective product and document through company reporting process	• Procedure of quality control inspection • Product product testing methodology • Statistical Process Control (SPC) • Interpretation of product design specification • Root cause analysis • Engineering Design • Basic of Total Quality Management (TQM)

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

SUPERVISORY COMPETENCY FOR QUALITY CONTROL INSPECTOR	
SKILLS CATEGORY	**SKILLS**
Accounting	• Apply knowledge of accounting-related concepts • Prepare cash flow reports for the business unit
Analytical, Conceptual and Evaluative	• Solve problems and make decisions from a manangement perspective • Support the establishment of a framework for initiative and enterprise
Business Analytics	• Apply data visualisation • Solve problems using operations research techniques
Business Negotiation	• Participate in dispute resolution • Participate in negotiations
Communication	• Manage meetings • Presentation • Reports writing
Finance	• Conduct financial analyses of the business unit • Manage budgets and forecasting processes for the business unit • Monitor cash flow reports
Human Resource Management	• Manage employees' relations • Support individual learning and development
Interpersonal	• Build a working team • Lead a virtual team • Lead workplace communication and engagement
Personal Management and Development	• Apply high emotional intelligence to manage self and others in a business context • Contribute towards a learning organisation • Manage workplace challenges with resilience

JOB DESCRIPTION TABLE FOR QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

SUPERVISORY COMPETENCY FOR GALVANISING TECHNICIAN	
SKILLS CATEGORY	**SKILLS**
Project Management	• Conduct project after-action review • Conduct project feasibility study • Manage project costs • Manage project procurement • Manage project quality • Manage project resources • Manage project risk • Manage project scope • Manage project team • Manage project timeline
Sales and Marketing	• Understand sales and marketing strategies of manufacturing industry
Risk Management	• Apply risk management procedures
Workplace Safety and Health	• Ensure workplace safety and health procedures are complied

ANNEX 3
LIST OF CRITICAL JOB TITLES

LIST OF CRITICAL JOB TITLES

NO	CRITICAL JOB TITLE	AREA	LEVEL
1	R&D Engineer (Electrical)*	Machinery & Equipment (M&E) Design - Electrical	5
2	R&D Assistant Engineer (Electrical)	Machinery & Equipment (M&E) Design - Electrical	4
3	Electrical Supervisor*	Machinery & Equipment (M&E) Design - Electrical	3
4	Electrical Technician*	Machinery & Equipment (M&E) Design - Electrical	2
5	R&D Engineer (Control System)	Machinery & Equipment (M&E) Design - Control System	5
6	R&D Assistant Engineer (Control System)	Machinery & Equipment (M&E) Design - Control System	4
7	R&D Engineer (Mechanical)*	Machinery & Equipment (M&E) Design - Mechanical	5
8	R&D Assistant Engineer (Mechanical)	Machinery & Equipment (M&E) Design - Mechanical	4
9	Mechanical Supervisor*	Machinery & Equipment (M&E) Design - Mechanical	3
10	Mechanical Technician*	Machinery & Equipment (M&E) Design - Mechanical	2
11	Metal Machining Production Engineer	Metal Machining – Turning, Milling & Boring	5
12	Metal Machining Production Assistant Engineer	Metal Machining – Turning, Milling & Boring	4
13	Metal Machining Production Engineer	Metal Machining - Grinding	5
14	Metal Machining Production Assistant Engineer	Metal Machining - Grinding	4
15	Metal Machining Production Engineer	Metal Machining - Honing	5
16	Metal Machining Production Assistant Engineer	Metal Machining - Honing	4
17	Metal Machining Production Engineer	Computer Numerical Control (CNC) Machine Operation - Turning	5
18	Metal Machining Production Assistant Engineer	Computer Numerical Control (CNC) Machine Operation - Turning	4
19	Metal Machining Production Engineer	Computer Numerical Control (CNC) Machine Operation – Milling & Boring	5
20	Metal Machining Production Assistant Engineer	Computer Numerical Control (CNC) Machine Operation – Milling & Boring	4
21	Metal Machining Production Engineer	Computer Numerical Control (CNC) Machine Operation - Grinding	5
22	Metal Machining Production Assistant Engineer	Computer Numerical Control (CNC) Machine Operation - Grinding	4
23	Heat Treatment Metallurgist	Heat Treatment	5
24	Heat Treatment Assistant Metallurgist	Heat Treatment	4
25	Industrial Engineer	M&E Fabrication, Assembly and Repair - Industrial Engineering	5
26	Industrial Assistant Engineer	M&E Fabrication, Assembly and Repair - Industrial Engineering	4
27	Electrical Engineer	M&E Fabrication, Assembly and Repair - Electrical	5
28	Electrical Assistant Engineer	M&E Fabrication, Assembly and Repair - Electrical	4
29	Electrical Supervisor	M&E Fabrication, Assembly and Repair - Electrical	3
30	Electrical Technician	M&E Fabrication, Assembly and Repair - Electrical	2

LIST OF CRITICAL JOB TITLES

NO	CRITICAL JOB TITLE	AREA	LEVEL
31	Electronic Engineer	M&E Fabrication, Assembly and Repair - Electronic	5
32	Electronic Assistant Engineer	M&E Fabrication, Assembly and Repair - Electronic	4
33	Mechanical Engineer	M&E Fabrication, Assembly and Repair - Mechanical	5
34	Mechanical Assistant Engineer	M&E Fabrication, Assembly and Repair - Mechanical	4
35	Mechanical Supervisor	M&E Fabrication, Assembly and Repair - Mechanical	3
36	Mechanical Technician	M&E Fabrication, Assembly and Repair - Mechanical	2
37	Quality Control Engineer	Manufacture of Machinery and Equipment Quality Management - Quality Control	5
38	Quality Control Assistant Engineer	Manufacture of Machinery and Equipment Quality Management - Quality Control	4
39	Quality Assurance Engineer	Manufacture of Machinery and Equipment Quality Management - Quality Assurance	5
40	Quality Assurance Assistant Engineer	Manufacture of Machinery and Equipment Quality Management - Quality Assurance	4
41	Robot Designer	Robotic Engineering - Robot Design	5
42	Robot Assistant Designer	Robotic Engineering - Robot Design	4
43	Robot Making Technician	Robotic Engineering - Robot Design	3
44	Robotic System Design Engineer	Robotic Engineering - Integrated Robotic System Design	5
45	Robotic System Design Assistant Engineer	Robotic Engineering - Integrated Robotic System Design	4
46	Robotic Operation Operator	Robotic Engineering - Integrated Robotic System Design	3
47	Robotic System Design Engineer	Robotic Engineering - Robotic Programming	5
48	Robotic System Design Assistant Engineer	Robotic Engineering - Robotic Programming	4
49	*Robotic Operation Operator	Robotic Engineering - Robotic Programming	3
50	Robotic System Design Engineer	Robotic Engineering - Robotic Operation Control & Maintenance	5
51	Robotic System Design Assistant Engineer	Robotic Engineering - Robotic Operation Control & Maintenance	4
52	Robotic Operation Operator	Robotic Engineering - Robotic Operation Control & Maintenance	3
53	Electrical Engineer	Automation System Engineering - Electrical	5
54	Electrical Assistant Engineer	Automation System Engineering - Electrical	4
55	Electrical Supervisor	Automation System Engineering - Electrical	3
56	Electrical Technician	Automation System Engineering - Electrical	2
57	Electronics Engineer	Automation System Engineering - Electronic	5
58	Electronics Asst. Engineer	Automation System Engineering - Electronic	4
59	Electronics Supervisor	Automation System Engineering - Electronic	3
60	Electronics Technician	Automation System Engineering - Electronic	2

LIST OF CRITICAL JOB TITLES

NO	CRITICAL JOB TITLE	AREA	LEVEL
61	Mechatronics Engineer	Automation System Engineering - Mechatronic	5
62	Mechatronics Asst. Engineer	Automation System Engineering - Mechatronic	4
63	Mechatronics Supervisor	Automation System Engineering - Mechatronic	3
64	Mechatronics Technician	Automation System Engineering - Mechatronic	2
65	Mechanical Engineer	Automation System Engineering - Mechanical	5
66	Mechanical Assistant Engineer	Automation System Engineering - Mechanical	4
67	Mechanical Supervisor	Automation System Engineering - Mechanical	3
68	Mechanical Technician	Automation System Engineering - Mechanical	2

* Job Title listed from COL 2018/2019

ANNEX 4
TRAINING CONTENT TABLE

MECHANICAL ENGINEER AND MECHANICAL TECHNICIAN

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Mechanical Engineers play an important role in the M&E industries. They design, develop, build, and maintain all sorts of mechanical devices, tools, engines and machines. He/She was able to design, manufacture and maintain everything from small parts like miniature connectors to large machine tools like drill presses. They take a product from start to finish, and design for aesthetics, functionality, and durability.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Mechanical Design***	• Regulatory and authority body compliance requirement • Quality management requirement • Product conceptual design modelling • Design engineering analysis • Design specification preparation • Bill of Material list
			Product Protoyping***	• Design fabrication and assembly • Testing and commissioning on product design (NDT & DT) • Fine tuning and optimisation for product design • Final product prototyping
			Product Documentation Management***	• Product prototyping documentation management
			Research & Development (R&D) Engineering Fundamental***	• Geometrical Dimensioning and Tolerance (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Advanced machining Process • Mechanical and chemical properties • Ergonomics and AestheticValue • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive Manufacturing

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupation Title: • Process Engineer • Industrial Engineer • Pneumatic Engineer • Hydraulic Engineer • Engineering Assistant • Junior Engineer • Field Engineer • Associate Engineer • Quality Control • Engineer • Quality Assurance • Engineer **Pre-requisites:** • Not Available	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Production Planning	- Internet of Things - Cybersecurity - Cloud computing - Augmented Reality • Product specification development - Material specification - BOM list - Design drawing • Machine operation and machining process • Resources planning for production requirements
			Product Fabrication	• Machine parameter setting • Advanced machining activities • CNC machine operation • Product fabrication operation planning • Heat treatment operation for product • Product finishing method
			Quality Inspection***	• Fabricated product quality inspection • Inspection test procedure • Product quality management

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Process Improvement	• Process improvement requirement • Overall Equipment Effectiveness (OEE) analysis
			Product Assembly	• Subpart and final product assembly process • Product functionality testing procedure • Product packaging requirement
			Product Testing and Commissioning***	• Product Testing and Commissioning - Factory Acceptance Test (FAT) - Site Acceptance Test (SAT)
			M&E Assembly, Testing and Repair Engineering Fundamental	• Machining process • Overall Equipment Effectiveness (OEE) • Statistical Process Control (SPC) • Autonomous Maintenance • Root cause analysis • Engineering design • Total Quality Management (TQM) - Quality Management System (QMS) - Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma • Hydraulic and Pneumatic System • Machine Load Balancing

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering		• Numerical Control • Industrial Revolution 4.0 (IR4.0) - Autonomous Rob System Integration - Simulation - Additive Manufacturing - Internet of Things - Cybersecurity - Cloud computing • Augmented Reality
			System Operation***	• Automation System Operation and Control • Production preparation process • Troubleshooting procedure for system operation
			Robot Design***	• Robot mechanical, electrical and electronic system • Robot modelling design • Electrical & Electronic Circuit Design • Electrical & Electronic Layout and • Wiring Diagram Design • Engineering, electrical and electronic system analysis • Product prototyping

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Robotic Engineering Fundamental***	• Geometrical Dimensioning and Tolerance (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Machining Process • Mechanical Properties • Ergonomics and Aesthetic Value • Industrial Revolution 4.0 (ir 4.0) - Autonomous Robot - System Integration - Simulation - Additive Manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
			Robotic Programming***	• Autonomous module robotic programming • Human machine interface (HMI) development • Robotic system program integration • Robotic system program development • Robotic system calibration • Robotic motion programming • Robotic vision programming • Robotic special function programming • Robotic peripherals program integration

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Robotic Programming Engineering Fundamental***	• Embedded System Programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Networking and Communication Protocol - Wired - Wireless • Sensing and Control - Instrumentation - Vision System • Cybersecurity • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing • Augmented Reality
		Automation System Engineering	Automation & Robotic System Integration***	• Analysing automation and robotic system integration • Automation and robotic system integration
			Automation System Support***	• Automation system troubleshooting • Planning and monitoring system maintenance

TRAINING CONTENT : MECHANICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Automation System Engineering Fundamental***	• Lean Manufacturing • Embedded System Programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC)/ Industrial Personal Computer (IPC) • Instrumentation and Control • Industry 4.0 (i4.0) - Autonomous Robot - System Integration - Simulation - Additive Manufacturing - Internet of Things - Cybersecurity - Cloud computing • Augmented Reality
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personal Management and Development • Leadership and People Management • Workplace Safety and Health ***** Critical Training Program/Skills in Demand**

TRAINING CONTENT : MECHANICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Mechanical Technician primary focus is performing maintenance, service and repair of facilities, machineries and equipment. He/She may involve in providing costs estimation of projects, prepare layouts and drawings of parts, review blueprints or assemble parts and equipment. She also performs tests on a finished product according to manufacturer's manual and organisation Standard Operating Procedure.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Design Support Operation***	• Formal test protocols and reports • Test protocols, methods and procedures. • Test equipment and records measurements • Generation, design and troubleshooting of testing fixtures
			Product Prototyping***	• Product design fabrication and assembly activities • Product Testing Method - Non Destructive Testing (NDT) - Destructive Testing (DT) • Basic in fine tuning and optimisation for product design
			Product Documentation Management***	• Product prototype documentation management • Product testing and commissioning data.
			Research & Development (R&D) Engineering Fundamental	• Machining Process • Mechanical Properties • Chemical Composition • Product Testing Method - Non-Destructive Testing (NDT) - Destructive Testing (DT)

TRAINING CONTENT : MECHANICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • R&D Mechanical • Technician • Industrial Mechanical • Technician • Machine Operator • Machinist **Pre-requisites:** • Not Available			Product Fabrication Operation	• Machine parameter setting • Machining activities • CNC machine operation • Product fabrication operation including - Cutting - Forming - Joining • Heat treatment operation • Performing product finishing method
			Quality Inspection Activities	• Method of product functionality testing • Production process quality inspection
			Process Improvement	• Basic of machine optimisation activities • Basic of process improvement activities • Basic of production process improvement
			Product Assembly	• Procedure of product functionality test - Component - Subpart • Product packaging requirement
			Product Testing & Commissioning	• Product testing and commissioning

TRAINING CONTENT : MECHANICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Quality Management	Quality Control	M&E Fabrication, Assembly and Repair	• Machining Process • Statistical Process Control (SPC)
			Engineering Fundamental	• Maintenance Operation - Preventive Maintenance - Corrective Maintenance - Predictive Maintenance • Machine Load Balancing • Computer Numerical Control Programming • Product inspection method - Non-Destructive Testing - Destructive Testing
			Quality Control Operation	• Product final inspection • Visual inspection of optical parts. • Dimensional measurements • Quality control operation standard
			Quality Control Fundamental Engineering	• Procedure of quality control inspection • Product testing methodology • Statistical Process Control (SPC) • Interpretation of product design specification • Root cause analysis • Engineering Design • Basic of Total Quality Management (TQM)

TRAINING CONTENT : MECHANICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering	Robotic System Installation, Maintenance and Operation***	• New robotic systems fabrication and installation • Modification of computer-controlled robot movements. • Building or assembling robotic devices or systems. • Development of robotic path motions • Design, configuration, or application of robotic systems support. • Preventive or corrective maintenance on robotic systems or components. • Robotic system installation and maintenance operation • Industrial robotic system evaluation - Efficiency - Reliability • Robotic operation
			Robotic Fundamental Engineering***	• Geometrical Dimensioning and Tolerance (GD&T) • Mechanical Properties • PLC and Micro Controller Programming
	Industrial Automation Engineering	Automation System Engineering	Mechanical System Maintenance	• Automation system equipment and operating system inspection • Resolving motor, pump, conveyor, pneumatic and hydraulic issues.
			Automation System Fundamental Engineering***	• Automation system operation • Geometrical Dimensioning and Tolerance (GD&T) • Mechanical Properties • PLC and Micro Controller Programming

TRAINING CONTENT : MECHANICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Supervisory Competency	Supervisory Competency	• Basic Project Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Basic of Human Resource Management • Interpersonal Skills • Personnel Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health ***** Critical Training Program/Skills in Demand**

ELECTRICAL ENGINEER
AND
ELECTRICAL TECHNICIAN

TRAINING CONTENT : ELECTRICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Electrical Engineer plays an important role in the M&E industries. They design, develop, and test electrical devices and equipment, including communications systems, power generators, motors and navigation systems, and electrical systems. They also oversee the manufacture of these devices, systems, and equipment. He/She apply the principles of electricity, electronics, and electromagnetism to develop electrical products and systems. They perform risk assessments and ensure compliance with safety standards and electrical engineering codes. They also conduct research to create new applications.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Electrical Design***	• Electrical design specification • Electrical system analysis • Electrical system simulation • Electrical layout and wiring diagram design preparation - Electrical Schematic Diagram - Electrical Component Layout Diagram - Control panel layout diagram - Electrical wiring diagram • Conceptual Design • Design specification requirement preparation • Regulatory and authority body compliance requirement for electrical design
			Electrical System Testing and Commissioning***	• Electrical system fine tuning and optimisation • Power loading analysis • Electrical Panel Missouri Educator • Gateway Assessments (MEGA) Testing procedure • Earth Leakages testing procedure
			Product Documentation Management***	• Product prototype documentation management

TRAINING CONTENT : ELECTRICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • Process Engineer • Industrial Engineer • Pneumatic Engineer • Hydraulic Engineer • Engineering Assistant • Junior Engineer • Field Engineer • Associate Engineer **Pre-Requisites:** • Not Available		Research & Development (R&D) Engineering Fundamental***	Electrical Design***	• Lean manufacturing • Power management • Ingress Protection (IP) Rating • Electrical load calculation and component selection • Compliance standard and power consumption for electrical component • Power protection system and grounding • Risk assessment method • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation	• Machine electrical parameter setting • Electrical component assembly - Subpart - Final Product • Electrical component and subparts functionality testing procedure
			Product Testing and Commissioning	• Product testing and commissioning for electrical component or subparts - Factory Acceptance Test (FAT) - Site Acceptance Test (SAT)

TRAINING CONTENT : ELECTRICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			M&E Fabrication, Assembly and Repair Engineering Fundamental	• Machining Process • Overall Equipment Effectiveness (OEE) • Autonomous Maintenance • Root cause analysis • Engineering Design • Total Quality Management (TQM) - Quality Management System (QMS) - Lean Manufacturing - oka yoke - Kaizen - 6 Sigma • Numerical Control • Industrial Revolution 4.0 (ir 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
	Industrial Automation Engineering	Automation System Engineering	Electrical Automation System Operation***	• Automation system operation and control • Production preparation process • Automation and robotic system integration for electrical component • Electrical system troubleshooting on automation system • Electrical system maintenance planning and implementation strategy

TRAINING CONTENT : ELECTRICAL ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Automation System Engineering Fundamental***	• Geometrical Dimensioning and Tolerance (GD&T) • Lean Manufacturing • Finite Element Analysis (FEA) • Machining Process • Mechanical Properties • Chemical Composition • Ergonomics and Aesthetic Value • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personnel Management and Development • Leadership and People Management • Workplace Safety and Health • Analytical, Conceptual and Evaluative

***** Critical Training Program/Skills in Demand**

TRAINING CONTENT : ELECTRICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Electrical technicians help create, maintain and repair the electronic components and equipment used in any equipment or device that involves electricity. They can sometimes work with electricians or electrical engineers, or work on site to keep machinery and specialty equipment running correctly. He/She may use specialized measuring and diagnostic devices to evaluate how electrical equipment is working, building or calibrating instrumentation, build electronic devices based on reading schematics, inspect for problems, replace old equipment and install new equipment.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Design Support Operation***	• Fundamental of design drawing • Installation, maintenance and inspection of tools and equipment • Electrical component specification • Electrical component assembly procedure. • Cable laying procedure • Testing procedure for electrical system • Functionality testing procedure for electrical system • Electrical system and component maintainance operation • Machine parameter setting
			Product Prototyping***	• Electrical system design and assembly activities • Electrical system testing and commissioning on product design • Fine tuning and optimisation for product design
			Product Documentation Management***	• Documentation management system

TRAINING CONTENT : ELECTRICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • R&D Electrical • Technician • Industrial ELectrical • Technician • Electrician			Research & Development (R&D) Engineering Fundamental***	• Machining Process • Electrical Wiring • Electrical Power • Electrical Measuring instrument • Interpretation of Wiring Circuit Diagram
Pre-Requisites: • Not available	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Electrical System, Operation Support and Maintenance***	• Electrical system setup for machine operation • Machine maintenance operation • Troubleshooting electrical machine faulty
			Product Fabrication Operation***	• Cable laying procedure • Electrical system and component maintenance operation • Procedure of machine parameter setting • Machine operation checklist • Prepare machine operation report • Testing procedures for electrical system • Electrical component specification • Installation, maintenance and inspection of tools and equipment • Interpret design drawing
			Quality Inspection Activities***	• Product functionality testing • Production process quality inspection

TRAINING CONTENT : ELECTRICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Product Testing & Commissioning ***	• Electrical system FAT and SAT procedures for product testing
			M&E Fabrication, Testing and Repair Fundamental Engineering***	• Maintenance procedures for electrical system • Occupational Safety and Health Compliance Requirement • Related statutory and regulatory compliance requirement on electrical • Interpretation of design drawing • Cable laying procedure • Cable arrangement • Electrical component specification • Types and function of electrical component
	Industrial Automation Engineering	Robotic Engineering	Robotic System Installation, Maintenance and Operation***	• Interpreting design drawing • Electrical component specification for robotic system • Assembly of electrical component for robotic system. • Cable lays as per diagram • Robotic system functionality testing procedure for electrical system

TRAINING CONTENT : ELECTRICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Robotic Fundamental Engineering***	• Robotic system engineering • SI System of Units • AC and DC current • Electrical and Electronic symbols • Basic electrical concepts and terms - Electrical voltage. - Electrical current. - Electrical resistance - Electric power. - Electric charge. - Power efficiency. - Power factor.
		Automation System Engineering	System Maintenance***	• Automation system inspection and testing • Interpreting blueprints • Designing, drawing, assembling and installation of electrical components. • Troubleshooting procedure for electrical system • Safety warning postings and identification tags
			Automation System Fundamental Engineering***	• Automation system operation • Maintenance procedures for electrical system • Occupational Safety and Health Compliance Requirement • Related statutory and regulatory compliance requirement • Interpretation of design drawing • Cable laying procedure • Cable Arrangement • Electrical component specification • Types and function of electrical component • PLC and Micro Controller Programming

TRAINING CONTENT : ELECTRICAL TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource • Management • Interpersonal • Personnel Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health

ELECTRONIC ENGINEER AND ELECTRONIC TECHNICIAN

TRAINING CONTENT : ELECTRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Electrical Engineer plays an important role in the M&E industries. They design, develop, test, or supervise the manufacturing and installation of electronic equipment, components, or systems for commercial, industrial, or scientific use. He/She can be specialised within the field, with areas of expertise including audio, visual and light electronic equipment; control systems and automation; and microelectronics (computer chips) and telecommunications.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Electronic Circuit Design***	• Electronic circuit design specification requirement - Regulatory and Authority Body Compliance Requirement - Quality Management • Electrical system simulation • Preparing and analysis of electrical layout and wiring diagram design - Electrical schematic diagram - Electrical component layout diagram - Control panel layout diagram - Electrical wiring diagram • Electronic circuit design conceptual design • Design analysis • Engineering analysis • Bill of Material (BOM) preparation
			Product Prototyping***	• Printed Circuit Board (PCB) Fabrication • Electronic component assembly • Embedded system programming
			Electrical System Testing and Commissioning ***	• Electrical system fine tuning and optimisation • Electrical system functionality test • Electro Magnetic Pulse (EMP) testing • Electro Magnetic Interference (EMI) testing • Electro Magnetic Compatibility (EMC) testing

TRAINING CONTENT : ELECTRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • Electronic Engineer • Control System Engineer • Engineering Assistant • Junior Engineer • Field Engineer • Associate Engineer **Pre-Requisites** • Not available			Product Documentation Management Research & Development (R&D) for Electronic Engineering Fundamental***	• Product prototype documentation management • Lean Manufacturing • Circuit Theory - Analogue Circuit - Digital Circuit • Electronic Component Selection • Machining Process • Ingress Protection rating (IP rating) • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Networking and Communication Protocol - Serial Communication - etherCAT - Modbus - CANbus • Instrumentation and Control • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality

TRAINING CONTENT : ELECTRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation	• Machine parameter setting • Machine instrumentation and control signal functioning • Maintenance operation planning • Machine troubleshooting for electronic faulty
			Product Testing and Commissioning	• Product Testing and Commissioning - Factory Acceptance Test (FAT) - Site Acceptance Test (SAT)
			M&E Fabrication, Testing and Repair Engineering Fundamental	• Sensoring and Image Processing • Circuit Diagram • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Total Quantity Management (TQM) • Quality Management System (QMS) • Lean Manufacturing - Poka Yoke - Kaizen - 6 Sigma • Root cause analysis • Autonomous Maintenance

TRAINING CONTENT : ELECTRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Automation System Engineering	Electronic System Operation***	• Automation system operation and control • Automation and robotic system integration for electronic and control system component • Electronic and control system troubleshooting on the automation system • Electronic and control system maintenance
			Automation System Fundamental Engineering***	• Lean Manufacturing • Circuit Theory - Analogue Circuit - Digital Circuit • Electronic Component Selection • Machining Process • Ingress Protection rating (IP rating) • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CANbus • Instrumentation and Control • Industrial Revolution 4.0 (IR4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing

TRAINING CONTENT : ELECTRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
				- Internet of Things - Cybersecurity - Cloud computing • Augmented Reality
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personnel Management and Development • Leadership and People Management • Workplace Safety and Health
				***** Critical Training Program/Skills in Demand**

TRAINING CONTENT : ELECTRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
An industrial electronics technician is responsible for maintaining, troubleshooting, and repairing electronic components of the M&E in factories or other industrial facilities. They may be responsible for installing, inspecting, and improving the efficiency in equipment as well. He/She may inspect and maintain existing equipment using similar tools, such as voltmeters and PC-based diagnostic software which requires analysis and troubleshooting of complex problems. Electronics technicians may also replace existing equipment based on age, operation, and functionality.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Design Support Operation	• Electronic system drawing • Electronic and control system component assembly • Cable laying • Electronic and control system testing • Electronic and control system maintenance operation
			Product Prototyping***	• Basic in electronics and control system design and assembly activities • Electronic and control system testing and commissioning on product design • Electronic system fine tuning and optimisation for product design
			Product Documentation Management	• Product prototype documentation management
			Research & Development (R&D) Fundamental Engineering	• Sensoring and Image Processing • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of Circuit Diagram • Circuit Diagram • Machining Process • Electronic Measuring instrument

TRAINING CONTENT : ELECTRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • R&D Control System • Technician • Industrial Electronic • Technician • Electronic Technician • **Pre-Requisites** • Not available	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Electronic System, Operation Support and Maintenance***	• Electronic and control system setup for machine operation • Machine maintenance activities for electronic system • Troubleshooting procedure for electronic and control system machine faults
			Product Fabrication Operation***	• Electronic and control system installation procedure • Assembly of electrical component. • Electronic and control system maintenance operation • Electronic and control system testing • Procedure to interpret electronic circuit design drawings
			Quality Inspection Activities***	• Product functionality testing method • Production process quality inspection
			Product Testing and Commissioning ***	• FAT and SAT activities for electronic system
			M&E Fabrication, Testing and Repair Engineering Fundamental***	• Engineering design • Electronic and control system system maintenance operation • Occupational Safety and Health Compliance Requirement • Interpretation of circuit design drawing • Electronic component specification • Types and function of electronic and control system component

TRAINING CONTENT : ELECTRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering	Robotic System Installation, Maintenance and Operation***	• Electronic circuit design drawing • Assembly of electronic and control system component. • Electronic equipment installation for robotic system • Testing activities of electronic and control system for robotic system • Functionality testing procedure for electronic and control system • Electronic and control system maintenance for robotic system maintenance
		Automation System Engineering	System Maintenance***	• Electrical component inspection and testing for automation system • Electronic components system maintenance • Designing, drawing, assembling and installation of electrical components. • Electrical system troubleshooting
			Automation System Fundamental Engineering***	• Sensoring and Image Processing • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of Circuit Diagram • Circuit Diagram • Machining Process - Electronic Measuring Instrument • PLC and Micro Controller Programming

TRAINING CONTENT : ELECTRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health *** **Critical Training Program/Skills in Demand**

MECHATRONIC ENGINEER AND MECHATRONIC TECHNICIAN

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Mechatronic Engineers work in all aspects of the development of the smart machine from design and testing to manufacture robotics and manufacturing industries. He/She responsible to research, design, develop, or test automation, intelligent systems, smart devices, or industrial systems control.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Mechanical System Design***	• Mechanical system design specification requirement • Mechanical system simulation • Conceptual design production • Design analysis for mechanical system design • Electro mechanical system design - Power Train - Hydraulics - Pneumatics • Engineering analysis for mechanical system design • Production of Bill of Material (BOM)
			Electrical & Electronic System Design***	• Engineering analysis for electrical & electronic system design • Fine tuning and optimisation • Power loading analysis • Electrical & electronic layout and wiring diagram design - Electrical & electronic schematic diagram - Electrical & electronic component layout diagram - Control panel layout diagram - Electrical wiring diagram

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • Automation Engineer • Control System • Engineer • Instrumentation • Engineer • Systems Engineer • Service Engineer • Associate Engineer **Pre-Requisites:** • Not Available			Product Prototyping***	• Mechatronic design fabrication and assembly • Testing and commissioning on product design (NDT & DT) • Fine tuning and optimisation for product design • Producing final product prototyping
			Electrical System Testing and Commissioning***	• Fine tuning and optimisation for • Mechatronic system • Functionality test for Mechatronic system • Electrical system testing procedure - Carry out Electrical Panel Missouri Educator Gateway Assessments (MEGA) Test - Earth Leakages Testing - Electro Magnetic Pulse (EMP) testing - Electro Magnetic Interference (EMI) testing - Electro Magnetic Compatibility (EMC) testing
			Product Documentation Management	• Product prototype documentation management
			Research & Development (R&D) Engineering Fundamental***	• Instrumentation and Control • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CANbus • Embedded system programming - Micro Controller - PLC • Programmable System on Chip (PSoC) • Field Programmable Gate Array (FPGA)

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
				• Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Electronic Component Selection • Ingress Protection rating (IP rating) • Machining Process • Finite Element Analysis (FEA) • Digital circuit • Analogue circuit • Ergonomics and Aesthetic Value • Chemical Composition • Mechanical Properties • Lean Manufacturing • Geometrical Dimensioning and Tolerance (GD&T) • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Product Fabrication & Assembly Operation***	• Machine parameter setting according to product specification • Production planning • Machining activities • Product fabrication activities • Prosess improvement analysis and fine tuning requirement • Maintenance operation planning • Machine troubleshooting

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Product Testing and Commissioning***	• Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) for mechatronic system
			M&E Assembly, Testing and Repair for Mechatronic Engineering Fundamental***	• Sensoring and Image Processing • Circuit Diagram • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Total Quality Management (TQM) • Quality Management System (QMS) • Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma • Engineering Design • Root cause analysis • Autonomous Maintenance • Statistical Process Control (SPC) • Overall Equipment Effectiveness (OEE) • Machining Process • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering	Robotic Mechanical System Design and Operation***	• Robotic mechanical system simulation • Design analysis on robotic mechatronic system design • Electro mechanical system design for robotic system - Power train - Hydraulics - Pneumatics • Engineering analysis on robotic mechatronic system design • Fine tuning and optimisation on robotic mechatronic system designs • Produce BOM list
			Robotoc Electrical & Electronic System Design and Operation***	• Electrical & electronic system design and optimisation • Power loading analysis • Electrical & electronic layout and wiring diagram design - Electrical & electronic schematic diagram - Electrical & electronic component layout diagram - Control panel layout diagram - Electrical wiring diagram

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering	Robotic Fundamental Engineering***	• Instrumentation and Control • Networking and Communication Protocol - Serial communication - etherCAT - Modbus - CANbus • Embedded system programming - Micro Controller - PLC • Programmable System on Chip (PSoC) • Field Programmable Gate Array (FPGA) • Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Electronic component selection • Ingress Protection rating (IP rating) • Machining Process • Finite Element Analysis (FEA) • Digital circuit • Analogue circuit • Ergonomics and Aesthetic Value • Chemical Composition • Mechanical Properties • Lean Manufacturing • Geometrical Dimensioning and Tolerance (GD&T) • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Automation System Engineering	Automation & Robotic System Integration***	• Automation and robotic system integration
			Automation System Operation***	• Automation system troubleshooting • Planning and monitoring of system maintenance
			Automation System Fundamental Engineering***	• Lean Manufacturing • Embedded system programming - Micro Controller - PLC - Programmable System on Chip (PSoC) - Field Programmable Gate Array (FPGA) - Single Board Computer (SBC) / Industrial Personal Computer (IPC) • Instrumentation and Control • Industrial Revolution 4.0 (IR 4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality

TRAINING CONTENT : MECHATRONIC ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personnel Management and Development • Leadership and People Management • Workplace Safety and Health • Analytical, Conceptual and Evaluative ***** Critical Training Program/ Skills in Demand**

TRAINING CONTENT : MECHATRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Mechatronic Technician is responsible for assisting design, development and engineering staff, as well as work with mechatronics trades people to install, maintain, modify and repair mechatronic systems, equipment and component parts. He/She may also carry out fitting and assembling parts and sub-assemblies, inspecting equipment on site, examining drawings or specifications, and also checking accuracy and quality of finished parts, tools or sub-assemblies.	Machinery & Equipment (M&E) Design	Research & Development (R&D)	Design Support Operation	• Test protocols and reports • Test equipment and records measurements • Vision systems and metrology hardware/software • Generating, designing and troubleshooting of testing fixtures
			Product Prototyping	• Mechatronic component design fabrication and assembly activities • Testing and commissioning on product design (NDT & DT) • Fine tuning and optimisation for product design
			Product Documentation Management	• Product prototype documentation management
			Research & Development (R&D) Engineering Fundamental	• Machining Process • Mechanical Properties • Chemical Composition • Product Testing Method - Non-Destructive Testing - Destructive Testing

TRAINING CONTENT : MECHATRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
Related Occupational Title: • R&D Control System • Technician • Industrial Electronic • Technician • Electronic Technician **Pre-Requisites:** • Not Available	M&E Assembly, Testing and Repair	M&E Assembly, Testing and Repair	Electronic System, Operation Support and Maintenance	• Troubleshooting machine faulty • Machine setup • Machine maintenance operation
			Product Fabrication Operation	• Machining activities • CNC machine operation • Product fabrication operation - Cutting - Forming - Joining • Heat treatment for product • Product finishing method
			Quality Inspection Activities	• Product functionality testing • Production process quality inspection
			Product Testing and Commissioning	• FAT and SAT activities for electrical system
			M&E Fabrication, Testing and Repair Fundamental Engineering	• Machining Process • Statistical Process Control (SPC) • Maintenance Operation - Preventive - Corrective - Predictive • Machine Load Balancing • Computer Numerical Control Programming • Types of product inspection method - Non-Destructive Testing - Destructive Testing

TRAINING CONTENT : MECHATRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	Industrial Automation Engineering	Robotic Engineering	Robotic System Installation, Maintenance and Operation***	• New robotic systems fabrication and installation • Modifying computer-controlled robot movements. • Building and assembling robotic devices or systems. • Developing robotic path motions • Robotic systems or components maintenance operation. • Robotic system and component installation, programming and maintenance • Industrial robotic system evaluation - Efficiency - Reliability • Operating robots to perform customised tasks
		Automation System Engineering	Mechatronic System Maintenance***	• Automation system equipment and operating system inspection • Mechatronic system maintenance
			Automation System Engineering Fundamental	• Sensoring and Image Processing • Automation Engineering • Network and Communication Protocol - Wired - Wireless • Embedded System Programming - PLC - MC • Quality Management System (QMS) • Interpretation of engineering drawing • Interpretation of Circuit Diagram • Interpretation of Wiring Circuit Diagram • Machining Process • Automation system operation

TRAINING CONTENT : MECHATRONIC TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource • Management • Interpersonal • Personnel Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health ***** Critical Training Program/Skills in Demand**

METAL MACHINING ENGINEER, MACHINIST & CNC MACHINIST

TRAINING CONTENT : METAL MACHINING ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Metal Machining Engineer is responsible to determine product specification, plan machining operation. He/She also required to maintain a centralized program database and detailed records on all CNC machine operations. **Related Occupation Title:** • Metal Machining Engineer • Metal Machining Specialist **Pre-requisites:** • Not Available	M&E Fabrication	Machining & Special Tooling	Machine Operation Planning and Monitoring***	• Planning, designing, purchasing and implementing machining processes and equipment • Designing, developing, implementing and analysing technical products and systems • Equipment engineering design evaluations • Equipment capability evaluation • Developing machine and equipment operation and maintenance SOP • Setting up reduction and changeovers according to product specification • Preparation of project costing • Developing CNC programs for machine operation
			Machining & Special Tooling Fundamental Engineering***	• Overall Equipment Effectiveness (OEE) • Total Quality Management (TQM) • People management • Resources planning • Strategic planning • SOP and method of statement preparation • CNC Programing • Risk assessment • Office management

TRAINING CONTENT : METAL MACHINING ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
	M&E Fabrication	Machining & Special Tooling	Machine Operation Planning and Monitoring***	• Purchasing procedure • Project costing • Industrial Revolution 4.0 (IR4.0) - Autonomous Robot - System Integration - Simulation - Additive manufacturing - Internet of Things - Cybersecurity - Cloud computing - Augmented Reality
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personnel Management and Development • Leadership and People Management • Workplace Safety and Health

*** **Critical Training Program/Skills in Demand**

TRAINING CONTENT : MACHINIST & CNC MACHINIST

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Machinist job is to assemble or fabricate mechanical parts, pieces or products using a variety of tools and equipment according to specification. He/She usually specialise either in CNC or convensional machine. They are also reviewing samples, drawings or instructions, plan process sequence and taking measurements and marking material for cutting or shaping. **Related Occupation Title:** • Machine Operator • Machinist • CNC Machinist **Pre-requisites:** • Not Available	M&E Fabrication	Machining & Special Tooling	Machining Operation	• Setting up machine operation • Setup jigs and fixtures • Machine calibration • Consumable tools replacement procedure • Statistical Process Control (SPC) for machining operation
			CNC Machining Operation	• CNC machines operation • Interpreting blueprints and mechanical drawings • Translating instructions into computer commands • Producing test runs sample • Finished product quality control
			Machining & Special Tooling Fundamental Engineering	• Interpretation of Engineering Drawing • Geometrical Dimensioning and Tolerance (GD&T) • Machine Operation - Operation Manual - Maintenance Manual • Safety instruction • Measuring instrument • Statistical Process Control (SPC) • CNC Machine operation • Numerical control

TRAINING CONTENT : MACHINIST & CNC MACHINIST

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource • Management • Interpersonal • Personnel Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health ***** Critical Training Program/Skills in Demand**

HEAT TREATMENT METALLURGIST & HEAT TREATMENT OPERATOR

TRAINING CONTENT : HEAT TREATMENT METALLURGIST

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Heat Treatment Metallurgist is responsible to develop and manufacture metal items and structures that range from tiny precision-made components to huge engineering parts. He/She is able to work with a range of metals including copper, precious metals, iron, steel, zinc and aluminium alloys. **Related Occupation Title:** • Heat Treatment Engineer **Pre-requisites:** • Not Available	M&E Fabrication	Heat Treatment	Heat Treatment Operation*** Heat Treatment Engineering Fundamental***	• Heat treatment cycle and processes • Equipment operational safety and maintenance • Method for heat treatment process • Cost analysis for forging and heat treatment process • Developing work procedure, process improvement and cost saving recommendation for customer • Material selection and treatment process • Developing product and process design specification of new and existing material. • Performing SAT and uniformity check • Familiarity with statistical process control method • Site Acceptance Test (SAT) and Uniformity check for heat treatment • Basic metallurgist of alloy and gasses • Material selection and treatment process • Root cause analysis • Cost analysis • Heat treatment cycle and process specification • Procedure to develop heat treatment process SOP

TRAINING CONTENT : HEAT TREATMENT METALLURGIST

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
			Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Mangement • Strategy Planning and Implementation • Personnel Mangement and Development • Leadership and People Management • Workplace Safety and Health *** **Critical Training Program/Skills in Demand**

TRAINING CONTENT : HEAT TREATMENT OPERATOR

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Heat Treatment primary job function is responsible for the heat treat processes and monitor the furnace lines in the heat treat department.	M&E Fabrication, Assembly and Repair	Heat Treatment	Heat Treatment Operation Support	• Operation of heat treating furnaces • Maintaining heat number and grade traceability • Hardness testing procedure.
He/She is responsible to set up, operate, or tend heating equipment, such as heat-treating furnaces, flame-hardening machines, induction machines, soaking pits, or vacuum equipment to temper, harden, anneal, or heat-treat metal or plastic objects.			Heat Treatment Operation Support Engineering Fundamenta	• Heat-Treating Processes • Site Acceptance Test (SAT) and Uniformity check for heat treatment • Basic metallurgist of alloy and gasses • Material selection and treatment process • Heat treatment cycle and process specification
Related Occupational Title: • Process Engineer • Industrial Engineer • Pneumatic Engineer • Hydraulic Engineer • Engineering Assistant • Junior Engineer • Field Engineer • Associate Engineer		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health
Pre-Requisites - Not available				***** Critical Training Program/Skills in Demand**

PAINTING & BLASTING ENGINEER, THERMAL SPRAY PAINTER, GALVANISING TECHNICIAN & PLATING TECHNICIAN

TRAINING CONTENT : PAINTING & BLASTING ENGINEER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Painting & Blasting Engineer is responsible to carry analysis on painting surface prior to blasting and painting operation. He/She also required to determine the surface treatment requirement, quality control criteria and to inspect finish job quality on painted and cleaned surface area. **Related Occupation Title:** • Painting Engineer **Pre-requisites:** • Not Available	M&E Fabrication, Assembly and Repair	Protective Coating	Painting & Blasting	• Painting operation - Paint specifications - Paint quality • Surface treatment operation for painting
			Painting & Blasting Engineering Fundamental	• Surface treatment • Protective coating technology • Paint quality inspection
		Managerial Competency	Managerial Competency	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personnel Management and Development • Leadership and People Management • Workplace Safety and Health • Analytical, Conceptual and Evaluative *** **Critical Training Programs/Skills in Demand**

TRAINING CONTENT : PAINTING & BLASTING TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Painting and Blasting Technician performs all duties in the paint & blast process, such as surface preparation, spray-gun application of liquid coatings, wrapping painted products for shipment, operating heavy equipment to move product around the large pole coating facility and perform abrasive blasting to prepare products for application of liquid coatings. He/She also responsible for understanding and complying with safety and environmental regulations and policies as they pertain to the painting & blasting procedures. **Related Occupational Title:** • Blasting Technician • Painter **Pre-requisites:** • Not Available	M&E Fabrication	Protective Coating	Blasting Operation	• Paint and surface issues • Blasting operation • Blasting equipment operation and maintenance • Blasting material • Surface quality inspection
			Blasting Operation Fundamental Engineering	• Surface treatment • Protective coating technology
			Painting Operation	• Paint and surface issues inspection • Blasting activities operation • Painting surfaces preparation • Painting operation
			Painting Operation Fundamental Engineering	• Procedure of preparing painting surfaces • Removing old paint • Types of paint and surface issues • Decorative and faux finishes
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health

TRAINING CONTENT : THERMAIL SPRAY PAINTER

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Thermal Spray Painters clean and operate thermal spray machine according to machine operation manual. He/She also responsible to carry out surface cleaning prior to layering paint and maintaining technical equipment for the job. **Related Occupational Title:** • Spray Painter	M&E Fabrication, Assembly and Repair	Protective Coating	Thermal Spray Operation	• Thermal spray coating operation • Thermal spray machine operation • Thermal spray equipment maintenance operation
			Thermal Spray Operation Engineering Fundamental	• Thermal spray machine operation • Material specification for thermal spray • Thermal spraying procedure
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health
				***** Critical Training Program/Skills in Demand**

TRAINING CONTENT : GALVANISING TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Galvanising Technian clean, paint and varnish different surface types. He/She also responsible to carry out surface cleaning prior to layering paint and maintaining technical equipment for the job. **Related Occupational Title:** • Spray Painter	M&E Fabrication	Protective Coating	Galvanising Operation	• Galvanising operation • Galvanising equipment functionality inspection • Galvanising material preparation • Surface quality inspection
			Galvanising Operation Engineering Fundamental	• Types of surface defect • Galvanising operation • Galvanising equipment • Types of galvanising material
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health *** **Critical Training Program/Skills in Demand**

TRAINING CONTENT : PLANTING TECHNICIAN

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Plating Technician duties are to use a variety of chemical materials, such as copper or nickel, to coat the surface of plastic or metal products/parts. He/She also responsibilities are to operate the machinery designed to coat the products and monitor the process. You are also required to ensure the machinery set-up and calibrations are up to design specifications indicated by engineering or production blueprints. **Related Occupational Title:** • Planting Machine Operator	M&E Fabrication	Protective Coating	Planting Operation	• Plating line(s) inspection • Plating chemical handling - Plating in-process inspections - Chemical maintenance on plating line - Chemical additions to bath chemistries - Dumping and replenishing bath chemistries • Plating surfaces and parts preparation • Process improvement • Plating system and equipment maintenance operation
			Plating Operation Engineering Fundamental	• Plating operation • Chemical properties • Maintenance requirements on plating machine and equipment • Surface preparation for plating - Masking - Blasting - Cadmium plating
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personnel Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health

QUALITY CONTROL ENGINEER, QUALITY ASSURANCE ENGINEER & QUALITY CONTROL INSPECTOR

TRAINING CONTENT : QUALITY MANAGER (QUALITY CONTROL ASSURANCE

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
The Quality Manager plays a crucial role in business by ensuring that products meet certain thresholds of acceptability. They plan, direct or coordinate quality assurance programs and formulate quality control policies. They also work to improve an organization's efficiency and profitability by reducing waste. He/She is also responsible to supervise the inspection team who carry out the detailed assessment of products and their components at different stages of production. **Related Occupation Title:** • Painting Engineer **Pre-requisites:** • Not Available	Quality Management	Quality Control	Quality Control Operation***	• Quality Standards development and implementation strategy • Manufacturing inspection test plans • Root causes analysis
		Quality Assurance	Quality Assurance Operation***	• Quality assurance standard development and implementation strategy • Root causes analysis • Customer Relation Management
			Quality Management Fundamental***	• Overall Equipment Effectiveness (OEE) • Statistical Process Control (SPC) • Autonomous Maintenance • Root cause analysis • Engineering Design • Total Quality Management (TQM) - Quality Management System (QMS) - Lean Manufacturing - Poka yoke - Kaizen - 6 Sigma
			Quality Management Fundamental***	• Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Design Thinking • Interpersonal • Project Management • Strategy Planning and Implementation • Personal Management and Development • Leadership and People Management • Workplace Safety and Health

TRAINING CONTENT : QUALITY CONTROL INSPECTOR

JOB SUMMARY	JOB AREA	COMPETENCY AREAS	SKILLS CATEGORY	TRAINING MODULE
A Quality Inspector monitors the quality of incoming and outgoing products or materials for a company. He/She is also responsible in conducting tests, analyzing measurements, and overseeing production processes. They work in assembly lines or production departments. **Related Occupation Title:** • Product Inspector • Quality Inspector **Pre-requisites:** • Not Available	Quality Management	Quality Control	Quality Control Operation	• Types of inspection method • Inspection report preparation
		Quality Assurance	Quality Control Operation Fundamental Engineering	• Procedure of quality control inspection • Product product testing methodology • Statistical Process Control (SPC) • Interpretation of product design specification • Root cause analysis • Engineering Design • Basic of Total Quality Management (TQM)
		Supervisory Competency	Supervisory Competency	• Accounting • Analytical, Conceptual and Evaluative • Business Analytics • Business Negotiation • Communication • Finance • Human Resource Management • Interpersonal • Personal Management and Development • Project Management • Sales and Marketing • Risk Management • Workplace Safety and Health