# Module Synopses

## MC1 - Certificate in Fundamental Technical Training

### Module 1: Rail Systems Maintenance I (90 hrs)

This module provides students with the knowledge, skills and competencies to perform preventive and corrective maintenance activities as well as modification and/or overhaul works on passenger trains and its components. Students will be able to carry out troubleshooting to perform fault analyses, repairing of electronics, electrical and mechanical equipment of passenger trains as well as performing routine vehicle inspections in accordance to maintenance procedures and instructions.

### Module 2: Workplace Safety and Health I (40 hrs)

This module provide students the abilities to identify and manage risks associated with fatigue within the work environment to ensure all personnel are fit to perform assigned duties, maintain Workplace Safety and Health (WSH) standards and practices when working at heights by establishing safety protocols and complying with regulatory and other Work at Height (WAH) and WSH requirements.

Implement safety procedures and risk control measures in a public transport workplace environment and public access areas to ensure safety of staff and commuters. Assess casualties and apply first aid, Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) skills and abilities in the workplace

### Module 3: Rail Operation (15 hrs)

This module equip students the skills as Communication Controller to keep track of daily rail operations activities and supports the Operations Control Centre (OCC) in executing its tasks and requirements. Student will be able to monitor passenger activities and train operations to monitor passenger activities and train operations via close-circuit television (CCTV), and communication and alert systems, to provide train service information and updates to commuters and the public

Student will possesses excellent communication skills, and is able to succinctly disseminate train service information in real-time and under pressure. He is savvy in operating a range of surveillance and broadcast communication equipment.

### Module 4: Maintenance Management (30 hrs)

This module provides the students how to prepare organisational budgets to support short- and long term business plans through forecasting, allocation and financial policy setting. Learn to develop and implement business continuity plans for organisational preparedness of disruptive events. Manage organisational change management systems to drive organisation success and outcomes by preparing, equipping and supporting adoption of change. Students have the capability to identify data sets for the application of statistical techniques to analyse and interpret large complex data to uncover trends or patterns in order to locate and define new process improvement opportunities. Write reports using terminology appropriate to the reader as well as identify requirements for written reports

**MC2 - Certificate in Advanced Rapid Transit Technology**

**Module 1: Rail Systems Maintenance II (90 hrs)**

This module provides students with the knowledge, skills and competencies to perform preventive and corrective maintenance activities as well as modification and/or overhaul works on passenger trains and its components. Students will be able to carry out troubleshooting to perform fault analyses, repairing of electronics, electrical and mechanical equipment of passenger trains as well as performing routine vehicle inspections in accordance to maintenance procedures and instructions.

Students will be confident to manage the operations of train stations to achieve rail service continuity, safety and reliability.

**Module 2: Workplace Safety and Health II (30 hrs)**

This module provide the knowledge to create and maintain a Workplace Safety and Health culture based on a common set of attitudes, behaviours, and competencies. Student will be able to perform duties with proper supervision and safety precautions, when working in confined spaces and manage safety to minimise risks and hazards when performing electrical-related maintenance activities.

Students will learn to formulate and execute fire safety protocols and processes to minimise risk posed to customers during emergency situations involving fire and Investigate Workplace Safety and Health incidents and accidents based on root cause analysis and identification of corrective actions to prevent recurrences.

**Module 3: Process Improvement & Business Management (30 hrs)**

This module prepare our student to develop resource allocation plans and implementation of strategies and polices. Formulate the strategies polices that are forward looking and focuses on bottom line results. Student will be able to build actionable organisation strategy plan and policies that are forward looking, anticipate strategic risks and focus on bottom line results.

**Module 4: Critical Core Skills (Leadership) (30 hrs)**

Student will learn how to formulate and implement inventory management strategies targeted at ensuring availability of equipment, tools and materials for maintenance work. Equip with the skills to manage vendor by ensuring adherence to contract terms and organisation safety and operating requirements.

**MC3 - Modular Certificate in Electrical & Electronic Engineering**

**Module 1: Electrical Principles**

Covers the basic laws and theorems that govern the operation of electrical circuits. Topics covered include scientific notation, engineering notation, metric prefixes, definitions of energy and power, power sources, measuring instruments, DC and AC concepts, simple series and parallel networks, electromagnetism, inductor, inductance, transformers, Kirchhoff"s Voltage and Current Laws, Current and Voltage Divider Rules.

**Module 2: Digital Principles**

Covers the principles and design techniques to enable students to design simple combinational circuits using commercial SSI and MSI integrated circuits. Simple sequential logic circuits such as flip-flops and mono-stables are also introduced.

**MC4 - Modular Certificate in Technologies for Rail Engineering**

**Module 1: Industrial Internet of Things**

This module provides students with the concepts of The Internet of Things (IoT), starting with an introduction to various IoT technologies, data sensing and collection, wireless communication, network connectivity, cloud computing and data analysis.

It provides students with an understanding of the concept of various condition-based asset monitoring techniques at workplace. Students also learn how to determine conditions and identify variances in systems, equipment and components.

The module also cover the basic of cybersecurity and how it relates to the security and integrity of information and network. The module also introduce to students the characteristics of cybercrime, security principles, technologies and technologies to defend networks.

**Module 2: Engineering Data Analytics**

The module provides students with the concepts of data analytics in rail engineering, starting with an introduction to the tools for preparation and pre-processing of data, followed by various analysis tools in the domains of supervised and unsupervised learning. Students will learn how to identify data sets for the application of statistical techniques to analyse and interpret large complex data to uncover trends or patterns in order to locate and define new process improvement opportunities.

**Module 3: Operational Technology**

The module covers the maintenance fundamentals and various maintenance electrical & electronic systems.

This module also provide students with the concepts and knowledge on the planning and management of maintenance schedules in accordance to the organisational standards and Original Equipment Manufacturer recommendations at workplace.

Topics include work management process, job estimation and prioritisation, backlog management, job plan development, work scheduling and coordination, tracking progress and root cause analysis input.

**Module 4: Engineering Asset Management**

This module provides students the basic definitions, terminology and principles of Asset Management. Students will learn to identify and manage the expectations of different stakeholders with respect to asset management.

The module covers on the knowledge on the structured approach on the formulation and implementation of the organisation’s asset management policies to optimise asset life-cycle and performance.

Topics include Rail Asset Management, management of electrical & electronic systems and equipment, operations and maintenance and their associated performance, and risks and expenditures over the asset's lifecycle.

## MC5 - Modular Certificate in Rail Engineering Project

### Module 1: Engineering Project

Students will be assigned project(s) by their supervisor/mentor. This project(s) will be related to his area of work and serves to reinforce the knowledge and skills acquired through the modules learnt in MC1, 2, 3 and 4. This module will require students to learn to apply continuous improvement processes to optimise operating cost, task efficiency and effectiveness in production, services and processes.

The project scope will include specific technical skills in emerging technologies^ so that students will be able to understand the importance of digital transformation and create a project-based solution focusing on real work environment needs to enhance the efficiency, reliability and quality of their operation and services.

The student will learn to convey and exchange thoughts, ideas and information effectively through various mediums (verbal and written) and approaches (formal and informal). Articulate and discuss ideas and persuade others to achieve common outcomes.

^Rapid Transit Technology (Application)

### Module 2: Rapid Transit Technology (Application)

This module provides students with an understanding of the principles of operation of various technologies within the rapid transit system (RTS). An overview of key features of various sub-systems within the RTS (i.e. Power network, Signalling & Communication, Integrated Supervisory Control System, Permanent Way, Environmental Control System, E&M for Building services, Electrical-Rolling Stock and Automatic Fare Collection) are introduced.

With the emerging trend of digital transformation technologies (e.g. IoT, Data Analytics) impacting across all sectors of industry, student will learn the integration of technologies into operations of the RTS to enhance the efficiency, reliability and quality of their operation and services.