WORK-STUDY DIPLOMA IN PORT AUTOMATION TECHNOLOGY

MODULE OBJECTIVES

Core Modules

Port Automation

On completion of the module, trainees should able to perform system check on port automation equipment such as gantry crane, quay crane and automated guided vehicle. They should also be able to assess working fundamentals of automated equipment, including communication and controls.

Industrial Automation

On completion of the module, trainees should able to perform system check on an Automated Storage and Retrieval System (ASRS) including sub components such as conveyor, Human Machine Interface (HMI), Programmable Logic Controller (PLC) and robotics system in an industrial automation environment. They should also be able to interface, program and troubleshoot PLC-controlled applications, intelligent modules (using advanced PLC instructions) and robotics system.

Quality Management

On completion of the module, trainees should be able to analyse crane maintenance data, develop predictive maintenance plan, and implement engineering and safety management. They should also be able to supervise work performed by maintenance team and contractor, to ensure implementation of safety workflow and worker adoption of safety measures.

Sensor and Device Technology

On completion of the module, trainees should be able to install and troubleshoot various detection sensors, including video imaging, Lidar, ultrasonic as well as inertial measurement unit.

Network System

On completion of the module, trainees should be able to plan installation of network system, configure wired and wireless local area networks, wide area network and IoT communication, as well as troubleshoot network connectivity issue.

Security System

On completion of the module, trainees should be able to install and configure Windows and Linux operating systems on end-user computing device. They should be able to set up end-user device security as well as perform system maintenance and troubleshooting.

Electrical Motors and Control System

On completion of the module, trainees should be able to troubleshoot AC synchronous motor, induction motor and servo-drive. They should also be able to test open-loop control of AC motor and perform Proportional-Integral-Derivative (PID) tuning.

Company Project

On completion of the module, trainees should be able to apply skills and knowledge acquired to carry out a project relating to automated port operation/environment. They would need to document and prepare a project report, and conduct an oral presentation of the completed project.

On-the-Job Training I

On completion of the module, trainees should be able to apply relevant skills and knowledge acquired in the first year of study, to perform system check, troubleshoot port automation equipment as well as perform preventive, corrective and predictive maintenance.

On-the-Job Training II

On completion of the module, trainees should be able to apply relevant skills and knowledge acquired in the second year of study, to test and troubleshoot various network and control systems used in automated guided vehicle or port environment.

On-the-Job Training III

On completion of the module, trainees should be able to apply relevant skills and knowledge acquired in the course of study, to manage and co-ordinate activities relating to maintenance and troubleshooting of various port automation systems and equipment.

List of Skills for On-The-Job Training

Work-Study Diploma in Port Automation Technology

	Standard List of OJT Skills
	Module On-the-Job Training I
51	Perform system check on Rubber Tyred Gantry Crane
52	Perform system check on Rail Mounted Gantry Crane
53	Perform system check on Automated Rail Mounted Gantry Crane
54	Perform system check on Quay Crane
55	Perform system check on Automated Guided Vehicle
56	Install and interface modules in PLC system
57	Program PLC to perform sequential tasks
58	Collate performance data from crane computer
59	Analyse crane equipment maintenance data
60	Develop predictive maintenance plan
61	Review and conduct risk assessment
62	Supervise maintenance team
63	Supervise contractor/sub-contractor
64	Supervise implementation of safety workflow
65	Supervise worker adoption of safety measures
66	Install and troubleshoot video imaging detection sensor
67	Install and troubleshoot Lidar detection sensor
68	Install and troubleshoot ultrasonic sensor
69	Install and troubleshoot inertial measurement unit (gyroscope & accelerometer)
70	Troubleshoot and rectify RFID sensors
71	Perform rail alignment of port equipment
72	Perform axis alignment of rotating equipment
73	Troubleshoot crane automation system
74	Install and troubleshoot encoders

	Standard List of OJT Skills
	Module On-the-Job Training II
1	Set up and configure wired local area network
2	Configure Transmission Control Protocol/Internet Protocol (TCP/IP) services
3	Troubleshoot network/equipment connectivity issue
4	Perform check on various network systems
5	Perform link-up test of various network systems
6	Troubleshoot Controller Area Network
7	Troubleshoot Profi-bus and Profi-Net
8	Configure Windows system and Linux on PC
9	Replace hard disk and reinstate all necessary software required for the PC to function
10	Transfer and activate crane software licence
11	Troubleshoot AC motor
12	Troubleshoot induction motor
13	Troubleshoot servo-drive
14	Test open-loop control of AC motor
15	Perform Proportional-Integral-Derivative (PID) tuning
16	Perform maintenance on DC charging system
17	Perform maintenance on micro motion system of Automated Rail Mounted Gantry (ARMG)
18	Set up and configure navigation system computer
19	Troubleshoot electrical system (including batteries and charging system, and interpretation of electrical circuit diagram)
20	Perform maintenance of computer system
21	Troubleshoot computer hardware and software problems
	Module On-the-Job Training III
1	Manage project schedule
2	Manage resource allocation
3	Extract and analyse logged data
4	Perform maintenance of Spreader Position Control System (SPCS) of ARMG
5	Perform maintenance of chassis alignment system of ARMG
6	Perform maintenance of Stack Profiling Scanning System (SPSS)
7	Troubleshoot faults in hydraulics system
8	Troubleshoot faults in obstacle detection system
9	Perform maintenance of cooling system (battery, hydraulic and drive system)