

Module Synopsis
Diploma in Engineering (Advanced Manufacturing)

MC 1: Modular Certificate in Data Driven in Automation & Robotics		(180 hours)
1. MM9002:	AI-Driven Data Analytics for Sustainable Manufacturing	(60 hours)
This module equips students with the knowledge and practical tools to leverage Artificial Intelligence (AI) and data analytics in promoting sustainable practices across manufacturing operations. Students will explore how cutting-edge digital technologies—particularly AI, Enterprise Resource Planning (ERP), and Manufacturing Execution Systems (MES)—can be harnessed to reduce carbon emissions, optimize energy consumption, support circular economy models, and enhance overall operational efficiency.		
2. MM9203:	Automation & Robotics in Advanced Manufacturing	(60 hours)
This module equips learners with up-to-date knowledge and practical skills to implement automation and robotics technologies in the manufacturing industry. It covers fundamental concepts, system architectures, core functionalities, benefits, and application areas relevant to advanced manufacturing environments. Learners will also be introduced to key methodologies for effectively deploying automation and robotics systems. The module includes the Smart Factory concept and the Smart Industry Readiness Index (SIRI), providing learners with tools to assess digital maturity and support companies in their Industry 4.0 transformation journey.		
3. MM9611:	Programmable Logic Controller	(60 hours)
The aims of the module are to provide students with fundamental concepts and application examples to understand the operation and capabilities of programmable logic controllers (PLC) which has become an integral tool in industrial automation. Students will be able to design and implement simple control strategies using ladder diagram programming. Types and uses IO-Link devices will also be covered.		

MC 2: Modular Certificate in Productivity, Quality & Sustainability		(180 hours)
1. MM9431:	Sustainability Reporting & Strategies	(60 hours)
This module will cover the basics on the drivers for sustainability and how companies are affected by the global sustainability movement along with local regulations. Students will learn how standards like ISO 14064 can help their company to meet carbon emissions requirements by efficient energy use. They will also gain experience in performing carbon emissions calculations and reporting, with the use of basic carbon reporting tools.		
2. MM9801:	Industrial Engineering	(60 hours)

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This module provides understanding of productivity as well as knowledge and skills in the basics of industrial engineering which enhances productivity of the enterprise. Topics include method study, work measurement, enterprise resource planning, scheduling and ergonomics. Concepts and techniques taught include hands-on practical sessions.

3. MM9802: Quality Engineering & Management	(60 hours)
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This module teaches students the basic concept of quality management, knowledge of quality system standard as well as quality tools and techniques. Students will understand the requirements of the various quality system elements in ISO 9001. Students will also learn various techniques and statistical tools employed for controlling and improving quality in manufacturing organisation, including Measurement Fundamentals, Failure Mode & Effect Analysis, Statistical Quality Control and Design of Experiments.

MC 3: Modular Certificate in Engineering Design & Simulation	(180 hours)
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1. MM9102: Computer-Aided Drafting & Design	(60 hours)
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This module will enable the students to use Computer-Aided Drafting & Design (CADD) software to create parametric assembly models of mechanical devices, generate the corresponding assembly drawing and fully detailed drawings of parts with appropriate limits and fits, geometrical tolerances based on ISO Standard recommendations.

2. MM9107: Design for Manufacturing & Assembly	(60 hours)
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This module aims to explore the interactions between design and manufacturing from the designer's perspective, focusing on how design decisions influence production processes. Common manufacturing processes and its design guidelines will be introduced, allowing Learners to apply design principles in the creation of plastic and metal parts using CAD software for analysis and communication. Additionally, this module covers Geometric Dimensioning and Tolerancing (GD&T), enabling students to understand how to specify and communicate precise dimensional requirements to ensure manufacturability and quality.

3. MM9110: Fundamental of Mechanics & Simulations	(60 hours)
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This module is designed to introduce students to fundamental engineering concepts in the mechanics of materials, including stress, strain, and material properties. Students will learn how the design of components is influenced by the properties of chosen materials and the application of forces and torques. The course also covers basic finite element analysis (FEA), providing hands-on experience in modelling and analysing mechanical components, including their failure modes. By the end of the course, students will have a solid foundation in these essential topics, equipping them for practical applications in product design.

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MC 4: Modular Certificate in Manufacturing Technology		(180 hours)
1. MM9108:	Design for Jigs & Fixtures	(60 hours)
This module aims to equip students with an understanding of roles and important of Tooling Engineering in product development and manufacturing. Students will apply the working and basic design principles involved in sourcing quality tooling at the lowest cost such as fixture for machining, assembly and inspection fixture, mould and die for large volume manufacturing. Students will have an appreciation on the latest technologies used for tool development and fabrication processes.		
2. MM9204:	Manufacturing Processes	(60 hours)
This module introduces various manufacturing processes adopted in the industries from the conventional processes to the net-shaped manufacturing processes and the advanced manufacturing processes such as additive manufacturing. Students will acquire the fundamental knowledge of these manufacturing processes, their capability and limitations, and the selection/application of manufacturing processes for any given product.		
3. MM9206:	Digital Fabrication Technology	(60 hours)
This module introduces students to the fundamental concepts and practical skills in Additive Manufacturing (AM). Students will explore a range of AM processes—including Material Extrusion (MEX), and Powder Bed Fusion (PBF)—while gaining essential knowledge into health and safety aspects, post-processing, inspection, and an overview of the AM process certification. Through tutorials, and hands-on lab activities, students will gain an understanding of the AM workflow—from design to printing, post-processing, inspection, and testing. They will also explore basic principles of AM Design: CAD, Design for AM and complete the module by developing a project report based on a printed AM part.		

MC 5: Modular Certificate in Computer-Aided Manufacturing		(180 hours)
1. MM9500:	CNC Turning Technology	(60 hours)
This module provides students with a working knowledge on CNC Turning Centers. It covers the CAD/CAM application aspect on CNC Turning Components. Together with the practical session on Measurements, the module integrates the key manufacturing activities from Design, Manufacturing to Inspection of Precision Turning components.		
2. MM9501:	CNC Milling Technology	(60 hours)
This module provides students with a working knowledge on CNC Machining Centers. It covers the CAD/CAM application aspect on CNC Milling Components. Together with the practical session on Measurements, the module integrates the key manufacturing activities from Design, Manufacturing to Inspection of Precision Milling components.		

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3.	MM9503: Multi-axis Machining Applications	(60 hours)
This module provides application knowledge on Advanced CNC Multi-axis Machining Technology. This covers job planning, work holding, tool selection and development of machining sequences which lead to the achievement of precision component parts specifications. The smart factory concept with integrated machines will be introduced to prepare students to be Industry 4.0 ready.		