

# **Module Synopses**

## **MC 1 - Certificate in Engineering Drafting & Design (EDD)**

### **Computer-Aided Drafting**

This module provides the knowledge of interpreting and preparing engineering drawing of mechanical parts based on ISO Standard recommendations. Participants will be able to use Computer-Aided Drafting & Design (CADD) software to create parametric solid models of mechanical parts and generate the corresponding basic detailed drawings.

### **Computer-Aided Drafting & Design**

This module will enable the participants 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.

### **Machine Elements & Mechanisms Design**

This module introduces the application of limits and fits, geometrical dimensioning and tolerances for controlling the sizes and forms of parts to meet their design functions. The module also includes design and selection of standard engineering machine elements such as locking and fastening devices, bearing, gear-drives, belt-drives and chain-drives required in mechanical systems.

## **MC 2 - Certificate in Engineering Mechanics & Materials (EMM)**

### **Statics and Dynamics**

This module provides students with the basic concepts of applied mechanics; namely units and dimensions, equilibrium conditions, friction, kinematics and Newton's laws of motion.

### **Mechanics of Materials and Machines**

This module is a continuation from Engineering Mechanics I and provides basic concepts of Direct Stress and Strain, Shear Force and Bending Moment Diagrams, First and Second Moment of Area, Bending Theory, Torsion Theory, Torque and Moment of Inertia, Work Power Energy, Simple Lifting Machines and Centripetal Force. These will enable students to apply these to analyse the forces and stresses acting on simple engineering structures and machines.

### **Engineering Materials**

This module provides students with an introduction to the basic properties and applications of general engineering materials such as steel, cast iron, aluminium, copper, thermo-setting and thermo-plastics. Students will also be taught the practical skills in mechanical testing, common Non-Destructive Testing

(NDT) and metallographic techniques, as well as the knowledge in heat treatment of metallic materials and casting processes.

### **MC 3 - Certificate in Machining Technology (MCT)**

#### **CNC Turning Technology**

This module aims to provide students with a working knowledge of CAD/CAM programming and setting up of CNC machine to produce turning parts. Selection of appropriate machining parameters to achieve part specifications will be also addressed.

#### **CNC Milling Technology**

This module aims to provide students with a working knowledge on CAD/CAM programming and setting up of CNC machine to produce milling parts. Selection of appropriate machining parameters to achieve part specifications will be also addressed.

#### **Advanced Machining Processes**

This module aims to provide students with an integral approach to parts and components machining. Topics include job planning, work holding, tool selection and advanced machining processes. Students will also be provided with an introduction on multi-axis machine operations

### **MC 3A – Certificate in Port Equipment Technology**

#### **Port Equipment Engine Technology**

This module introduces students to 4-stroke cycle internal combustion engines.

Topics covered include basic engine performance and power calculations, followed by an introduction to the mechanical part of engines, engine systems – induction, oil, fuel, fuel metering and ignition. The student will learn of the engine fundamentals. Lubrication and cooling system.

#### **Port Equipment Hydraulic System**

This module introduces students to basic hydraulic fundamentals and principles of operation of such system on port equipment.

The topics covered include hydraulic fluids and seals, types and use; fluid lines and fittings, types and functionality; hydraulic system components, roles and functionality; crane hydraulic systems and specified basic components found in port equipment.

#### **Port Equipment Drives & Control System**

This module aims to provide knowledge to students on the practical aspects of industrial drives.

The topics cover DC Drives, AC Drives, Step Motor Drives and their applications, motor sizing, protection and drive system installation.

## **MC 4 - Certificate in Thermofluid Engineering (TFE)**

### **Thermofluid Systems**

This module will give a strong basic foundation to students in Thermodynamics and Fluid Mechanics. Topics covered include basics of fluid mechanics, perfect gas and steam. The course is practical based and lecturers are supplemented by comprehensive tutorials. Hands-on laboratory classes will reinforce concepts and will allow students to develop robust practical skill-sets on the topics studied.

### **Thermofluid Power**

This module aims to provide students with fundamental knowledge and basic principles in the Second Law of Thermodynamics Power Cycles, Air compressors, Conservation of Momentum and Conservation of Energy. Hands-on laboratory classes will reinforce the concepts learnt and will allow to develop robust practical skill-sets on the topics studied.

### **Engineering Thermodynamics**

This module aims to provide students with basic knowledge of heat transfer, combustion, steam nozzles, steam turbine cycles and gas turbine cycles. Lectures will be conducted to introduce key concepts and principles involved. Tutorials will be conducted for individual classes where students will consolidate their knowledge learnt in lectures by doing both descriptive and calculation questions under the guidance of a tutor.

## **MC 5 - Certificate in Automation Technology (AMT)**

### **Industrial Automation**

This module provides students with the fundamental knowledge and hands-on skills in pneumatic relay control system and Programmable Logic Controller (PLC) relevant to the local industries. At the end of the module, students will be able to design and assemble automation control circuits.

### **Mechanical Assembly Process**

This module provides the knowledge, techniques and skill –sets required of engineer in mechanical assembly processes. Interpretations of drawings, billing materials, project planning, quality assessment of parts and assembly techniques are essential skills that students will learn in this module. Students will also be taught how to make use of a range of tools and equipment required in the assembly process.

### **Mechanics of Machine Elements**

This module introduces the analysis of stress and strain in bodies under a static equilibrium and basic concepts of dynamics. Applications include the design of machine and structural elements.