

## HIGHER NITEC IN MECHATRONICS ENGINEERING

### CERTIFICATION

Credits required for certification:

Core Modules	: 50
Life Skills Modules	: 9
Elective Modules	: 4
<b>Total</b>	<b>: 63</b>

### COURSE STRUCTURE

Module Title	Credits
<b>CORE MODULES</b>	
CAD and Mechanical Applications	7
Electrical and Electronics Applications	7
Pneumatics and Automation	7
PLC and Motor Control	7
Cyber Physical Systems	7
Robotics Systems	7
Industry Attachment	8
<b>ELECTIVES (COURSE SPECIFIC)</b>	
Hydraulics	3
Single Board Micro-Controller Applications	2
Lean Manufacturing	2
Industrial Internet of Things (IIoT) System Integration	2
<b>ELECTIVES (INTER-DISCIPLINARY)</b>	
Applied Aviation Science and Mathematics	4
<b>ELECTIVES (JOINT ITE-INDUSTRY)</b>	
Integration of Vision with Servo Control	2
<b>ELECTIVES (GENERAL) AND LIFE SKILLS MODULES</b>	
For details, click <a href="#">here</a>	

*Note: The offer of electives is subject to the training schedule of respective ITE Colleges. Students are advised to check with their Class Advisors on the availability of the elective modules they intend to pursue.*

### MODULE OBJECTIVES

#### Core Modules

##### CAD and Mechanical Applications

On completion of the module, students should be able to read, interpret and produce common geometrical and mechanical drawings using Computer-Aided Drafting (CAD) software; use common tools and equipment to fabricate and service simple mechanical elements and assemble aluminium profile structures.

##### Electrical and Electronics Applications

On completion of the module, students should be able to analyse circuit schematic and board layout; and perform in-circuit measurement. They should also be able to identify faulty components and replace them. Students should also be able to conduct performance test to ensure that the circuit is working as intended.

### **Pneumatics and Automation**

On completion of the module, students should be able to apply electro-mechanical control systems, including common input / output devices, pneumatics and electro-pneumatics systems in industrial automation.

### **PLC and Motor Control**

On completion of the module, students should be able to apply Programmable Logic Controller (PLC) programming to interface and control PLC-controlled applications and to use advanced PLC instructions to program PLC intelligent modules for industrial automation.

### **Cyber Physical Systems**

On completion of the module, students should be able to troubleshoot and maintain sub-systems associated with Cyber Physical System / flexible manufacturing system, such as Conveyor, Automated Guided Vehicle, Automated Storage and Retrieval, Data Identification, Machine Vision, Human Machine Interface, Supervisory Control, Data Acquisition, Internet of Things, Communication Networking, Quality Assurance, Process Control and Maintenance Management.

### **Robotics Systems**

On completion of the module, students should be able to set up, program, operate, troubleshoot and maintain robotic system, and solve engineering problems involving statics, dynamics, kinematics and kinetics. Students are also trained to apply microcontroller programming concepts used in control circuits of microcontroller-based equipment.

### **Industry Attachment**

On completion of the module, students should be able to acquire and apply a cluster of key technical, social and methodological competencies in the occupation.

## **Electives (Course Specific)**

### **Hydraulics**

On completion of the module, students should be able to maintain hydraulic systems in industrial automation.

### **Single Board Micro-Controller Applications**

On completion of the module, students should be able to write structured programs to interface with peripheral devices and solve simple problems using single board micro-controller.

### **Lean Manufacturing**

On completion of the module, students should be able to work effectively as a team member to support lean manufacturing and process improvement in the industries and apply PDCA in continuous process improvement to increase productivity.

### **Industrial Internet of Things (IIoT) System Integration**

On completion of the module, students should be able to set up, integrate and program IIoT system with Programmable Logic Controller (PLC), gateway, Ethernet and internet connection from machine level (sensor and actuator in automation application) to data analytic and visualization in the cloud.

## **Electives (Inter-disciplinary)**

### **Applied Aviation Science and Mathematics**

On completion of the module, students should be able to apply fundamentals of mathematics, law of physics and basic aerodynamics principles to solve engineering related problems which are applicable to aircraft flight and ground operations.

## **Electives (Joint ITE-Industry)**

### **Integration of Vision with Servo Control**

On completion of the module, students should be able to implement a vision inspection system, perform servo motor control and interface vision system with servo motor control for inspection process.

## **Electives (General) and Life Skills Modules**

For details, click [here](#).