

# HIGHER NITEC IN ELECTRONICS ENGINEERING (3 YEARS)

## CERTIFICATION

Credits required for certification:

Foundation Modules	: 24
Core Modules	: 25
Specialisation Modules	: 20
Life Skills Modules	: 10
Cross Disciplinary Core Modules	: 9
Electives	: 8
<b>Total</b>	<b>: 96</b>

## COURSE STRUCTURE

Module Title	Credits
<b>FOUNDATION MODULES</b>	
Electrical & Cabling Technology	3
CAD & Soldering	3
Digital Electronics	3
Analogue Electronics	3
Programming Fundamentals	3
IoT Fundamentals	3
Networking & Communications Fundamentals	3
Cybersecurity Fundamentals	3
<b>CORE MODULES</b>	
Electronic Devices & Circuits	3
Digital Electronics & Simulation	3
Analogue Applications	3
Digital Applications	3
Computer Networking	3
Microcontroller Applications	3
Wireless Communications	3
Industry Attachment 1	4
<b>SPECIALISATION MODULES</b>	
<b>Group A (Audio Visual Systems)</b>	
AV Peripherals	3
AV Control & Automation	3
AV Integration	3
AV IT & Streaming	3
Industry Attachment 2	8
<b>OR</b>	
<b>Group B (IoT &amp; Communications)</b>	
Sensors & Actuators	3
IoT Protocols & Power Management	3
IoT Programming & Cloud Services	3
IoT Data Analytics & Visualisation	3

Module Title	Credits
Industry Attachment 2	8
<b>OR</b>	
<b>Group C (AI &amp; Automation)</b>	
AI Fundamentals	3
AI Applications	3
Principles of Autonomous Robotic System	3
Autonomous System Applications	3
Industry Attachment 2	8
<b>OR</b>	
<b>Group D (Microelectronics)</b>	
Semiconductor Fundamentals	3
Semiconductor Processes	3
Semiconductor Metrology	3
Industrial Automation	3
Industry Attachment 2	8
<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

### Foundation Modules

#### Electrical & Cabling Technology

On completion of the module, students should be able to set up, maintain and troubleshoot cabling systems.

#### CAD & Soldering

On completion of the module, students should be able to create and update CAD drawings, as well as build electronic prototypes.

#### Digital Electronics

On completion of the module, students should be able to set up and test digital electronic circuits.

#### Analogue Electronics

On completion of the module, students should be able to set up and test analogue electronic circuits.

#### Programming Fundamentals

On completion of the module, students should be able to apply programming constructs such as variables, programming syntax, sequential programming and control flow statements, in a programmable controller-based system.

#### IoT Fundamentals

On completion of the module, students should be able to configure, establish communication and process data from IoT environmental elements such as devices, nodes, gateways and cloud.

#### Networking & Communications Fundamentals

On completion of the module, students should be able to set up, configure, maintain and test computer and communication networks. They should also be able to identify the various network topologies and protocols, and troubleshoot network connectivity faults.

## Cybersecurity Fundamentals

On completion of the module, students should be able to apply the knowledge and essential skills in all security domains in the cyber world - information security, systems security, network security, mobile security, physical security, ethics and laws, related technologies, defence and mitigation techniques use in protecting.

## Core Modules

### Electronic Devices & Circuits

On completion of the module, students should be able to construct and test analogue electronic devices and circuits.

### Digital Electronics & Simulation

On completion of the module, students should be able to test and troubleshoot various digital electronic circuits.

### Analogue Applications

On completion of the module, students should be able to analyse, test and troubleshoot analogue electronic applications.

### Digital Applications

On completion of the module, students should be able to analyse, construct, test and troubleshoot digital electronic applications.

### Computer Networking

On completion of the module, students should be able to set up computer network, troubleshoot network connectivity issues, as well as test network performance.

### Microcontroller Applications

On completion of the module, students should be able to create algorithms and develop microcontroller applications with input and output devices.

### Wireless Communications

On completion of the module, students should be able to set up and test electronic communication systems.

### Industry Attachment 1

Students will undergo 3-month industry attachment to reinforce the skills and knowledge acquired at the training institute and to develop competencies in other areas not covered in the curriculum.

## Specialisation Modules

### Group A (Audio Visual Systems)

#### AV Peripherals

On completion of the module, students should be able to integrate AV devices with peripherals and accessories, as well as align AV equipment.

#### AV Control & Automation

On completion of the module, students should be able to install, configure, maintain and troubleshoot AV devices for network automation system.

#### AV Integration

On completion of the module, students should be able to design, install, test and troubleshoot an AV system for an application.

#### AV IT & Streaming

On completion of the module, students should be able to set up and configure networking devices for streaming network systems.

### Industry Attachment 2

Students will undergo 6-month industry attachment to reinforce the skills and knowledge acquired at the training institute and to develop competencies in other areas not covered in the curriculum.

## **Group B (IoT & Communications)**

### **Sensors & Actuators**

On completion of the module, students should be able to identify applications and perform installation of sensors and output devices.

### **IoT Protocols & Power Management**

On completion of the module, students should be able to install, interface and configure sensors and output devices with controller to establish network communication.

### **IoT Programming & Cloud Services**

On completion of the module, students should be able to apply programming skills with knowledge of embedded system, as well as principles of cloud computing and IoT systems.

### **IoT Data Analytics & Visualisation**

On completion of the module, students should be able to perform data visualisation and analysis for an IoT application by applying business intelligence.

### **Industry Attachment 2**

Students will undergo 6-month industry attachment to reinforce the skills and knowledge acquired at the training institute and to develop competencies in other areas not covered in the curriculum.

## **Group C (AI & Automation)**

### **AI Fundamentals**

On completion of the module, students should be able to perform various Machine Learning (ML) tasks by applying ML libraries and frameworks.

### **AI Applications**

On completion of the module, students should be able to solve real-world applications by applying AI services and technologies.

### **Principles of Autonomous Robotic System**

On completion of the module, students should be able to deploy and test autonomous systems, as well as perform localisation, mapping and navigation by applying robotic algorithms.

### **Autonomous System Applications**

On completion of the module, students should be able to deploy and troubleshoot autonomous systems, by applying principles of perception, planning, localising, mapping and decision-making capabilities.

### **Industry Attachment 2**

Students will undergo 6-month industry attachment to reinforce the skills and knowledge acquired at the training institute and to develop competencies in other areas not covered in the curriculum.

## **Group D (Microelectronics)**

### **Semiconductor Fundamentals**

On completion of the module, students should be able to perform cleanroom and safety protocols, and maintain vacuum systems.

### **Semiconductor Processes**

On completion of the module, students should be able to perform automated wafer processes for fabrication of integrated circuits used in electronic devices.

### **Semiconductor Metrology**

On completion of the module, students should be able to perform semiconductor metrology measurements for fabrication of integrated circuits processes.

### **Industrial Automation**

On completion of the module, students should be able to implement electro-mechanical control systems, including common input/output devices, pneumatics, electro-pneumatics and Programmable Logic Controller (PLC) systems in industrial automation.

### Industry Attachment 2

Students will undergo 6-month industry attachment to reinforce the skills and knowledge acquired at the training institute and to develop competencies in other areas not covered in the curriculum.

### Electives (General) and Life Skills Modules

For details, click [here](#).