

**COURSE PROSPECTUS**

<b>Name of the Group:</b>	EPDPT
<b>Name of the Course:</b>	Certificate course in <b>Internet of Things (IoT) using Raspberry Pi</b>
<b>Course Code:</b>	<b>ST100</b>
<b>Duration:</b>	80 Hrs
<b>Course Coordinator:</b>	Karthick Rajan. N

**Preamble:**

Internet of Things (IoT) is the next level technology getting more popular in the area of Industrial Automation. Internet of Things (IoT) is the network of physical things embedded with electronics, software, sensors, and connectivity enabling data exchange. Basically, a little networked computer is attached to a things, allowing information exchange to and from that things.

The explosive growth of the “Internet of Things” is changing our world and the rapid drop in price for typical IoT components is allowing people to innovate new designs and products at home. The Raspberry Pi is one of the small, affordable single-board computer that you will use to design and develop IoT devices. NodeMCU is an inexpensive, open-source development board for IOT platform. It refers to an Lua based firmware developed for ESP8266 Wi-Fi Soc (System on chip) from Espressif Systems that help to develop IoT applications.

Currently available academic curriculum is not much enough to fulfil the requirement for Skills needed in IoT technology. The lack of hands-on experience among professionals is one of the reasons for the slow growth in this sector. Hence there is a huge requirement for providing skill-based training in IoT technologies which will bridge the skill-gap of the engineering graduates.

**Objective of the Course:**

To equip and Skilling the engineering graduates with the information required in deploying and delivering an IoT Technologies suitable for Smart Industry.

**Outcome of the Course:** After successful completion of this Course, students can able to:

1. Get expertise on IoT technology and different protocols to be used in IoT devices.
2. Control input or output devices interfaced with NodeMCU by using mobile apps like BLYNK, ADAFRUIT IO, etc.
3. Able to write Python programs and create GUI applications for Raspberry Pi.
4. Gain Hands on experience to Publish and subscribe the data using MQTT Protocol.
5. Develop IoT applications using various platform and tools.

**Course Structure:**

Sl. No.	Topics	Duration
1	Introduction to IoT	2
2	Introduction to ESP8266(NodeMCU) and its Architecture	4
3	Interfacing Sensor & Actuators & Cloud Services with NodeMCU	16
4	Introduction and Booting Up Raspberry Pi	6
5	Python Programming	24
6	GUI Development using Python	8
7	Interfacing I/O devices and Sensors with RPi	16
8	Implementation of MQTT Protocol using RPi and NodeMCU	4
<b>Total</b>		<b>80</b>

**Other Details:**

**Course Fees:**

**For General Candidates:** Course fee is **Rs.4, 500/- (Including GST)**

**For SC/ST Candidates:** No Fee

However they are required to remit an amount of **Rs.1,000/-** as advance security deposit. This amount will be considered as security deposit and will be refunded after completion of the course. If the student fails to complete the course successfully this amount along with any other security deposits will be forfeited.

**Registration Fee:** (Non-refundable)

SC/ST: No registration fee

Others: **Rs.500/- (Including GST)**

However the above registration fee shall be refunded on few special cases as given below:

1. If course postponed and new date is not convenient for the student.
2. If course cancelled.

**Payment schedule:** The Fee is to be paid in one instalment as given below.

Instalment No.	Amount (in Rs.)
1.	5000/-

**Eligibility:** Students and Graduates of BE/B.Tech/M.Sc (Electronics/CS/IT)

**Number of Seats: 30**

## How to apply:

Candidates are advised to download the Registration from our website [www.nielit.gov.in/chennai](http://www.nielit.gov.in/chennai). After filling the form with all documents and fees, it can be submitted to NIELIT Chennai office in person or through post before starting of the course. Payment towards non-refundable Registration and Course fee can be paid through any one of the following modes:

- ✓ DD drawn from a nationalized bank (preferably SBI) in favour of “NIELIT Chennai” payable at Chennai.
  - ✓ Online transaction: Account No: 32558810978 Branch: Kottur (Chennai), IFS Code: SBIN0001669.
  - ✓ Pay through Nationalized Bank Debit Card (Service charges applicable)
- Note:* The Institute will not be responsible for any mistakes done by either the bank concerned or by the depositor while remitting the amount into our account.

**Selection of candidates:** First Come First Serve basis

## Admission Procedure:

All interested candidates are required to fill the Registration form with the fees (Registration and Course fees) with all the necessary following documents.

- Original and self-attested Copies of Proof of Age, Qualifications, etc.
- One passport size photograph and one stamp size photograph for identity card.
- Self-attested copy of Govt. issued photo ID card (AADHAR is mandatory for SC/ST Candidates).
- Self-attested copy of community certificate (if availing SC/ST fee concession)

*Note:* Working days are from Monday to Friday. Admission timings are from 9.00 am to 5.30 pm.

**Discontinuing the course:** No fees under any circumstances shall be refunded in case of a student discontinuing the course. No certificate shall be issued if discontinued.

**Course Timings:** 9:00 Pm to 5:30Pm (Monday to Friday)

**Location:** NIELIT Chennai is located at Gandhi Mandapam Raod, Kotturpuram, Chennai (Landmark: Opp. To Anna Centenary Library)



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Contact Person: Karthick Rajan. N, Mobile: 9080298798, 9940569468

**Course enquiries:** Students can enquire about the various courses either on telephone or by personal contact between 9.15 A.M. to 5.15 P.M. (Lunch time 1.00 pm to 1.30 pm) Monday to Friday.

## **Annexure**

### **Detailed Syllabus of the Course**

#### **1: Introduction to IoT**

- ✓ What is IoT?
- ✓ Terminologies in IoT
- ✓ Building Blocks of IoT
- ✓ How IoT Works?
- ✓ IoT Technologies-Protocols
- ✓ IoT Applications

#### **2: Introduction to ESP8266(NodeMCU) and its Architecture**

- ✓ What is NodeMCU?
- ✓ Architecture of ESP8266
- ✓ Pin Description of ESP8266
- ✓ Getting Started with the ESP8266 Programming

#### **3: Interfacing Sensor, Actuators & Cloud Services with NodeMCU**

- ✓ Controlling an LED and Switches
- ✓ Reading ADC values from a sensor
- ✓ Human Identification using PIR Sensor & NodeMCU
- ✓ Distance Measurement using Ultrasonic Sensor & NodeMCU
- ✓ Interface LM35 and LDR Sensor with NodeMCU
- ✓ Web Client (Connecting ESP 8266 with Wifi Router)
- ✓ Web Server (Publishing data to Web Server)
- ✓ Controlling the I/O Devices from a web server
- ✓ Controlling I/O Devices from a cloud dashboard
- ✓ Interfacing of Servo Motor with NodeMCU
- ✓ Interfacing of Relay Switch and NodeMCU and control using cloud services

#### **4: Introduction and Booting Up Raspberry Pi**

- ✓ Introduction to RPi
- ✓ Architecture of Rpi
- ✓ Pin Description of Raspberry Pi
- ✓ Mounting Raspbian OS in SD Card
- ✓ Booting & Configuring the RPi

### **5: Python Programming**

- ✓ Variable Types, Operators
- ✓ Decision Making and Loops Statements
- ✓ Strings Manipulation
- ✓ Lists, Dictionaries, Tuple
- ✓ Functions
- ✓ Modules
- ✓ File I/O's

### **6: GUI Development using Python**

- ✓ Tkinter Widgets
- ✓ Tkinter Button
- ✓ Tkinter Checkbutton
- ✓ Tkinter Text Entry
- ✓ Tkinter Frame
- ✓ Tkinter Label
- ✓ Tkinter Menubutton
- ✓ Tkinter Menu

### **7: Interfacing I/O Devices and Sensors with RPi**

- ✓ Interfacing Camera Module with Raspberry pi
- ✓ Interfacing Sense HAT with Raspberry pi
- ✓ Temperature and Humidity Measurement using DHT22 Sensor
- ✓ Controlling I/O Devices using Cloud Services

### **8: Implementation of MQTT Protocol using RPi and NodeMCU**

- ✓ What Is MQTT?
- ✓ Installing the MQTT Broker on the Raspberry Pi
- ✓ Testing the Broker
- ✓ Programming the ESP8266
- ✓ Communicating Between ESP8266 Devices