National Institute of Electronics and Information Technology, Chennai

COURSE PROSPECTUS

Name of the Group:	EPDPT
Name of the Course:	Post Graduate Diploma in **Internet of Things (IoT)**
Course Code:	**E043**
Starting Date:	15th April 2019
Duration:	470 Hrs
Course Coordinator:	Karthick Rajan. N
Last date of Registration:	12th April 2019

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 things, allowing information exchange to and from those 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. Arduino is an inexpensive, open-source development board used 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:

The objective of the course is to provide understanding of the techniques essential for designing prototype application for Internet of Thing (IOT) and Embedded System using sensor, actuator and wireless modules. This course offers a range of topics of immediate relevance to industry and makes the participants exactly suitable for Embedded Industry.

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

1. Design some IOT based prototypes

2. Exposure with different families and architectures of Internet of things and tools such as ARM Microcontrollers, Embedded operating systems, Wireless sensor networks, IoT architecture and protocols etc.

3. Expertise required to design any IoT products (H/w or S/w or both) based on any of the above devices.

Course Structure:

Module Code	Title of Unit or other Component	Mandatory / Optional	Estimated Size (Learning Hours)	Level
1	The Internet of Things: Brain Storming Basics	Mandatory	50	
2	The IOT Microcontroller Platform	Mandatory	75	
3	The Basics of Sensors and Actuators	Mandatory	75	
4	Interfacing of Android with Internet	Mandatory	75	7
5	Arduino Communication with Android Phone & Cloud	Mandatory	75	
6	IoT: Project	Mandatory	100	
7	Enhancing Communication& Soft Skill	Mandatory	20	
		Total	**470***	

(* - In addition to this topics on Arm Cortex-M4, Python Programming, Embedded Linux will also be covered)

Other Details:

Course Fees:

For General Candidates: Course fee is **Rs.28,000/- plus GST**

For SC/ST Candidates: No Fee

However they are required to remit an amount of **Rs.2,800/-**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.200/- plus 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.	Last Date for Payment	Amount (in Rs.)
1.	12-04-2019	28,200/- plus GST

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

Number of Seats: 30

How to apply:

Candidates are advised to download the Registration from our website 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 staring 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.

Last date of Registration: 12th April 2019

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) before 12th April 2019 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 Am to 5:30Pm (Monday to Friday)

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

Address: National Institute of Electronics and Information Technology Chennai Centre,
ISTE Complex, No. 25, Gandhi Mandapam Road, Chennai – 600025
E-mail: training.chennai@nielit.gov.in / Phone: 044-24421445
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: The Internet of Things: Brain Storming Basics

- ✓ Interaction with the Internet
- ✓ Major components of IoT devices
- ✓ Control Units, Sensors
- ✓ Communication Modules
- ✓ Power Sources
- ✓ RFID, Bluetooth
- ✓ ZigBee, WiFi
- ✓ RF Links, Mobile Internet
- ✓ Wired Communication

2: The IOT Microcontroller Platform

- ✓ Microcontrollers, Programming Microcontrollers
- ✓ Arduino Platform, The Boards
- ✓ The Anatomy of an Arduino Board
- ✓ The Development Environment
- ✓ Setup the IDE
- ✓ Writing Arduino Software
- ✓ The Arduino Sketch
- ✓ Some Basic Examples
- ✓ Trying the code on an Arduino Emulator - Extending Arduino
- ✓ Arduino Libraries
- ✓ Programming Arduino for the Internet of Things
- ✓ Using Timers, Threads
- ✓ Adding Security to Sensor Readings
- ✓ Authenticating and Encrypting Arduino Data

3: The Basics of Sensors and Actuators

- ✓ How Sensors Work,
- ✓ Analog and Digital Sensors,
- ✓ Pull-Up/Down resistors and Examples of sensors and working principles
- ✓ A brief Introduction to sampling theory, A/D conversion
- ✓ Acceleration, Temperature, Humidity, Distance, Light, Orientation, Sound, Electric Current
- ✓ Actuators, Relay Switch

- ✓ Servo Motor, Putting Things Together
- ✓ Sensing the World, Reading from Analog Sensors
- ✓ Digital Sensors, Sensors With On/Off Sates
- ✓ Using the Serial Protocol, The Software Serial Library
- ✓ Using the I2C Protocol, Communicating with a Digital Pressure Sensor
- ✓ Talking I2C through the Code, Read Data from another Arduino Board
- ✓ The SPI Protocol

4: Interfacing Arduino with Internet

- ✓ TCP/IP, IP/MAC Addresses, DNS and DHCP, Network Sockets, HTTP
- ✓ Connect Arduino using the Ethernet, Arduino Ethernet Library
- ✓ Simple Ethernet Client Example, Simple Ethernet Server Example
- ✓ Connect Arduino using the WiFi, WiShield Library
- ✓ WiFly Shield Library, Using the Arduino Library for Processing
- ✓ Send Arduino Data to our own Cloud Application
- ✓ Project Description, Using the Ethernet Shield
- ✓ Using a WiFi shield or a WiFi-enabled

5: Arduino Communication with Andriod Phone & Cloud

- ✓ Connecting Arduino with a mobile device
- ✓ The Android mobile OS, Communicating using Bluetooth, Hardware, Configure Bluetooth serial modem, Software
- ✓ Send Air Quality data to Android phone Using Android phone and Android Debug Bridge (ADB)
- ✓ Sending sensor data to Android – Arduino Code
- ✓ What is Cloud Computing, Cloud Computing Components, Cloud Computing Models and Architectures, Benefits of Cloud, Communicating with the Cloud using Web Services,SOAP and Restful Web Services, SOAP, REST, Cloud Computing and IoT, Thing Speak Internet of Things, The Nimbits Data logging Cloud, The iDigi Device Cloud, The Sensor Cloud
- ✓ Use Arduino to upload feed data from environmental sensors

6: IoT:Project

- ✓ Problem Identification Its Solution
- ✓ Mathematical analysis and modeling
- ✓ Simulation Result Verification
- ✓ Bread Boarding Physical Result verification
- ✓ PCB and Case Designing
- ✓ Final Product Development, Costing, Report Preparation

7: Enhancing Communication and Soft Skill

- ✓ Communication , verbal and non-verbal communication
- ✓ Building professional relationship, Relationship at work ,Making the most of personal and professional relationships
- ✓ Competency Description, Managing Difficult Business Relationships
- ✓ Interview Techniques: Planning For The Interview, Preparing for an Interview, Interview Formats, Stages Of The Interview, Types Of Interview Questions

- ✓ Best Bet for Interview Preparation: Mock Interviews, The Benefits of Mock Interviews Experience & Skills
- ✓ Curriculum Vitae: Overview, types of CV, Covering letter, Writing a Resume, Acceptance Letter, Thank You Letter

Note: Course content provided will be modified for further improvisation.