राष्ट्रीय इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी संस्थान, चेन्नई

National Institute of Electronics and Information Technology, Chennai

Autonomous Scientific Society of Ministry of Electronics & Information Technology (MeitY), Govt. of India

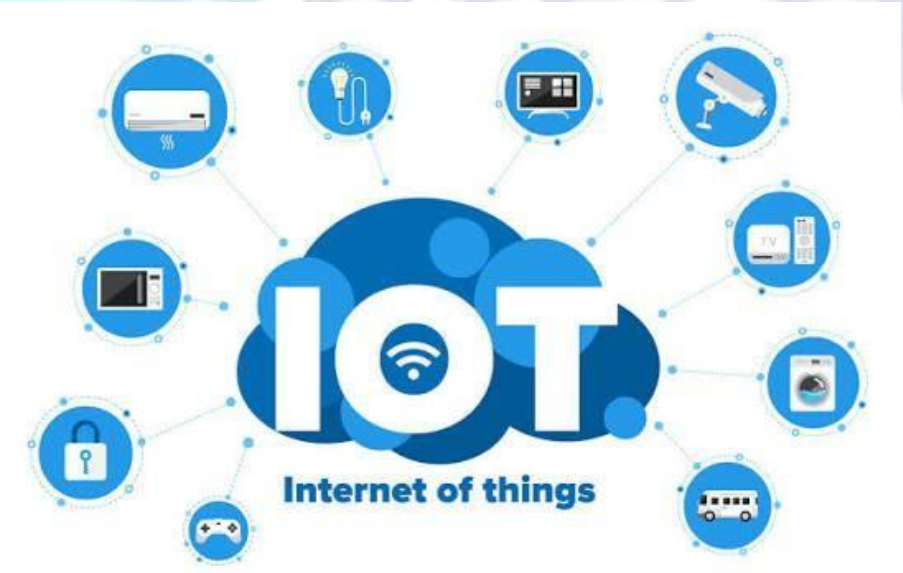
ISTE Complex, 25, Gandhi Mandapam Road, Chennai - 600025

Course Prospectus

Internet of Things (IoT) Associate

Mode: Online Mode

(NSQF-Level 4)



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Course Prospectus

Course Name: Internet of Things (IoT) Associate

Course Code: ED152-1

NSQF Level: 4

Duration: 450 Hrs

Last Date of Registration: 1st Oct 2026

Course Start Date: 7th Oct 2026

Fee Details:

Registration Fee- General/OBC/EWS: Rs. 1000/-

SC/ST: ***NIL***

Course Fee – General/OBC/EWS: Rs. 26,500/ *(payable in two installments))*

SC/ST: ***NIL***

Preamble:

The rapid expansion of the digital economy and smart infrastructure has created a growing demand for skilled professionals equipped with practical knowledge in connected electronics. Government initiatives like Digital India and Make in India have accelerated the adoption of smart devices across home automation, healthcare, and agriculture, driving the need for foundational expertise in the Internet of Things (IoT). With low-power hardware and accessible sensor technologies, learners can quickly build physical devices that collect data and communicate over the internet, marking the entry point into the Smart Connected Era.

This course introduces students to fundamental hands-on skills in the IoT domain. Designed for participants with basic technical exposure, the curriculum covers hardware and software fundamentals, sensor and actuator interfacing, core wireless networking protocols, and entry-level cloud dashboard integration. Overall, the program equips learners with essential practical experience to construct working IoT prototypes, building a strong foundation for technical roles and further specialization in embedded automation.

Objective of the Course:

The main objective of this training program is to equip participants with foundational knowledge and practical skills required to design, build, and deploy basic Internet of Things (IoT) applications. The program is of immediate relevance to industry and makes the participants exactly suitable for the IoT Industry

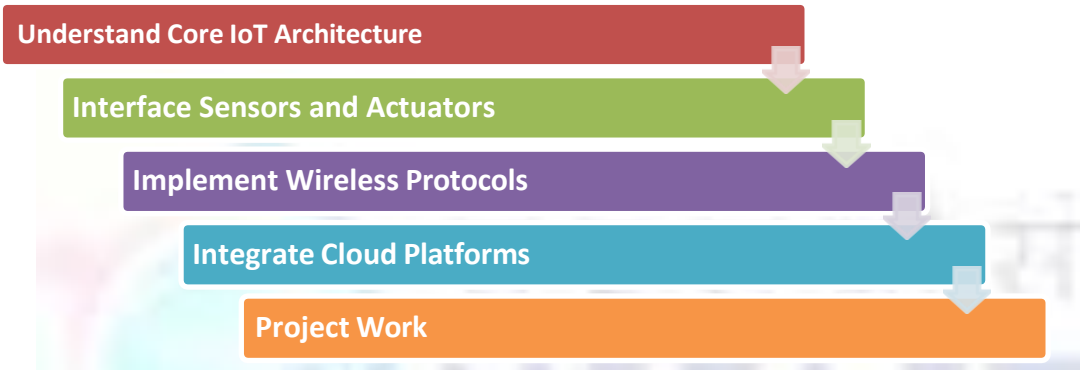
Outcome of the Course:

After successful completion of this Course, students will be able to:

- ❖ Fundamental layers of IoT systems, including perception, network, and application layers.
- ❖ Acquire hands-on experience in connecting, reading data from, and controlling physical hardware components and sensors.
- ❖ Configure and utilize standard communication protocols to enable seamless data transmission between hardware and remote networks.
- ❖ Connect IoT nodes to cloud services and platforms to visualize real-time data, manage devices, and set up basic automation rules.
- ❖ Develop end-to-end beginner-level IoT projects that solve real-world monitoring and control problems.

Full Flow of Course:

Course Structure:



This course contains totally six modules. After completing the first four modules, the students have to do a six weeks' project using any of the topics studied to earn the Internet of Things (IoT) Associate certificate.

Code	NOS Name	Duration(in Hours)
NOS -1	Identification and troubleshooting of Basic Electronics components	60
NOS -2	Conceptualising IoT Platform - Arduino/ESP32	120
NOS -3	Conceptualising IoT based use-cases	60
NOS -4	Fundamentals of wireless IoT using NodeMCU/ ESP32	90
NOS -5	Employability Skills	60
NOS -6	Project Work/OJT	60
Total Duration		**450**

Course Fees

The course fee is **Rs. 27,500/-** including GST. Can be paid as a single instalment or in 2 instalments as given below,

Fee Component	SC-ST Candidate	General/OBC/EWS Candidate	Last Date
Registration Fee	Nil	Rs. 1000/- for others (Adjustable with total fee)	1st Oct 2026
Tuition Fee (Including NSQF Registration & Examination Fee)			
1st Instalment	Nil	13,250/-	6th Oct 2026
2nd Instalment	Nil	13,250/-	15th Jan 2027
Total	Nil	26,500/-	

Registration Fee.

(**Non-Refundable if candidate is selected for admission but did not join and if a candidate has applied but not eligible.)**

SC/ST: Nil
Others: Rs. 1,000/- (Adjustable with Total fee for candidates)

However, the above registration fee shall be refunded in a few special cases as given below

- Candidates are eligible but not selected for admission.
- The course has been postponed, and the new date is not convenient for the student.
- Course cancelled.

Eligibility

- Completed 12th or equivalent

  (or)
- Completed 2nd Year of 3-Year Diploma after class 10th

  (or)
- Completed 10th with 2 year NTC

  (or)
- Previous relevant Qualification of NSQF Level 3.5 with 1.5 years of Experience

How to Apply?

Candidates can apply online in our website https://nva.nielit.gov.in/. Payment towards the non-refundable registration fee can be paid through any of the following modes:

- Online transaction:
  - **Account Name**: NIELIT CHENNAI
  - **Account No:** 31185720641
  - **Bank name:** State Bank of India (SBI)
  - **Branch:** Kottur (Chennai)
  - **IFSC Code:** SBIN0001669.
- Pay through UPI Mobile Apps

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: 1st Oct 2026

Registration Procedure:

All interested candidates are required to fill the Registration form online with registration fees before **1st Oct 2026** with all the necessary information.

Selection Criteria of candidates:

The selection to the course shall be based on the following criteria:

Selection of candidates will be based on their marks in the qualifying examination subject to eligibility and availability of seats.

- The Provisionally Selected Candidates will be informed regarding **selection via email**. In case of vacancy, additional selection lists will be prepared and will be intimated by email only.
- Provisionally selected candidate has to upload their document on registration portal for online verification.

  - ✓ Original Copies of Proof of Age, Community Certificate, Qualifying Degree (Consolidated Mark sheet & Degree Certificate/Course Completion Certificate), 10^{th} and 12^{th} mark sheet.
  - ✓ One passport size photograph.
  - ✓ Self-attested copy of Govt. issued photo ID card.

- After document verification, selected candidates have to pay first instalment of **Rs. 13,250**/-/- or as applicable on or before **6th October 2026** by payment mode mentioned above. Selected candidates are requested to upload the proof of remittance of fee on registration portal and also send the proof of remittance of fee as email to trng.chennai@nielit.gov.in

Admission:

All provisionally selected candidates whose documents are verified and have paid the fees (full or first instalment) and verified by the accounts section of NIELIT Chennai will get a welcome message for the provisional admission in his/her login ID provided during registration. The credentials and URL for the online portal will be shared through WhatsApp or email.

Note: provisionally selected SC/ST candidates are compulsorily required to visit NIELIT Chennai for biometric verification. The exact date and instructions will be communicated during the course.

Discontinuing the course:

- No fees (including the security deposit) under any circumstances, shall be refunded in the event of a student who have completed the process of admission or discontinuing the course in between. No certificate shall be issued for the classes attended. Only Grade Sheet will be issued.
- If candidates are not uploading consecutive 3 assignments within assigned time their candidature will be cancelled without any notice and all fees paid will be forfeited.
- If candidates are not appearing for any internal examinations/practical their candidature will be cancelled without any notice and all fees paid will be forfeited

Course Timings:

This program is a practical oriented one and hence there shall be more lab than theory classes. The cloud based online theory classes will be on forenoon and lab session will be conducted mostly on afternoon time.

Address:

National institute of Electronics and Information Technology
ISTE Complex, No. 25, Gandhi Mandapam Road, Chennai – 600025
E-mail: raghavendran@nielitchennai.edu.in
Phone: 044-24421445
Contact Person: Mr. Raghavendran S
Mobile: 8807775697 [Call @ 9 AM to 5 PM]

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.

Placement:

Students who have completed the course successfully and qualified, will be given placement guidance and career counselling to crack the interviews.

Important Dates:

- **Last Date of Registration:** 01-10-2026
- **Payment of first instalment fee**: on or before 06-10-2026
- **Course Start Date**: 07-10-2026
- **Payment of second instalment fee:** 15-01-2027

Examination & Certification:

Final Certificates will be issued after successful completion of all the modules including mini project. For getting certificate a candidate has to pass each module individually with minimum required marks of 50%.

Examination Scheme:

Examination scheme for each module is as follows:

Assessment Components	NOS Included	Duration (in mins)	Marks
Theory 1: IoT Associate Paper-1	NOS 1, NOS 4	90	100
Theory 2: IoT Associate Paper-2	NOS 2, NOS 3	90	100
Practical: IoT Assistant	NOS 1, NOS 2, NOS 3, NOS 4	180	90
Employability Skills	NA	60	30
Project/*OJT*	NA	60	30
		Total:	**350**

Grading Scheme:

- Following Grading Scheme (on the basis of total marks) will be followed:

Grade	S	A	B	C	D	Fail
Marks Range (in %)	85 to 100	75 to 84	65 to 74	55 to 64	50 to 54	Below 50

- Final Grading as per above grading scheme will be given on the basis of total marks obtained in all modules. For last module grade will be given on the basis of project demonstration.

Lab Infrastructure Details:

Hardware Facilities:

- Development Boards – Arduino UNO Board,ESP8266,Rasperrypi
- Sensors–PIR, Ultrasonic, Relay, Servo motors, Soil Moisture, Accelerometer & Gyro meter
- Cloud Platfroms-Thingspeak, AWS Google Cloud IoT, etc) and integration. ESP32 as wireless IoT platform

Software Facilities:

- Arduino IDE Software.
- Proteius Simulation Tools.
- Thingspeak, AWS IoT Cloud, Google Cloud IoT Etc..

Faculty Profile:

Dhirendra Kumar (STA), holds an **M.Tech in Microwave Electronics from the University of Delhi** and has **2 years of professional experience in the field of Internet of Things (IoT)**. Professional expertise encompasses **IoT technologies, embedded systems, Arduino-based platforms, sensors, microcontrollers, and IoT-based applications**. Academic and technical interests include **IoT, Electronics, Wireless Communication and Microwave Electronics.**

Raghavendran S (Project Engineer - RPA), with 7 years of experience bridging the gap between hardware and software automation. Expertise spans across Robotic Process Automation (RPA), Embedded Systems, and the Internet of Things (IoT). Leveraging a foundational background in Electronics and Instrumentation, he specializes in designing and delivering high-impact training sessions and hands-on laboratory modules.

Detailed Syllabus of the Course

NOS-1: Identification and troubleshooting of Basic Electronics components

Duration: 60 Hours

Objective:

The objective of the course is to provide an Identification and troubleshooting of Basic Electronics components and Measurement devices.

Module Description:

- **Identification characteristics of modern electronic components**
  - Understand the fundamentals of basic electronics, including concepts like current, voltage, resistance, capacitance, inductors, diodes, transistors, MOSFETs, LEDs
- **Understanding the Fundamentals of basic electronics including analog/digital circuits**
  - Identify basic electronic components such as resistors, capacitors, inductors, diodes, transistors, and LEDs, and understand their functions.
- **Troubleshooting of electronics components**
  - Gain theoretical knowledge of measurement devices, including multimeters, ammeters, voltmeters, and power supplies.
- **Understanding the operation of measurement devices.**
  - Learn the principles of troubleshooting common electronic circuit issues at a conceptual level.
- **Introduction to soldering, PCBs, and basic IoT hardware safety**

Learning Outcomes:

After successful completion of the module, the students shall be able to:

- Students will be able to identify the basic electronics components like Resistor, Inductor, diodes, transistor, LED, Capacitor etc.
- Students will be able to learn the fundaments of basic electronics.
- Students will be able to understand how to operate the multimeter,ammeter, voltmeter, voltage supply etc.
- Students will able to learn the operation of diodes, transistors, Zener diodes, rectifiers etc.
- Students will understand how to assemble the electronics components to make a circuit using Bread-board as well as veroboard.
- Students will be able to perform soldering - de-soldering along with troubleshooting the basic PCB circuits.
- Students will adhere to hardware safety and best practices for IoT prototyping.

NOS-2: Conceptualising IoT Platform - Arduino/ESP32

Duration: 120 Hours

Objective:

The objective of the course is to provide a Conceptualizing IoT Platform applications, protocols, use-cases Interfacing of sensors and actuators with Arduino Boards.

Module Description:

- **Introduction to microprocessor and micro controller**
  - Understand the difference between microprocessors and microcontrollers, and their roles in IoT systems
- **Introduction to Internet of Things(IoT) –applications,protocols, architecture, and emerging use-cases**
  - Learn IoT fundamentals, including applications, protocols, use-cases, and ecosystem components.
- **Arduino and ESP32 platforms overview**
  - Learn how to use Arduino and ESP32 Ide/Platforms and its components
- **Introduction to Arduino Embedded C Language**
  - Write and execute Embedded C programs to control IoT devices using Arduino boards.
- **Interfacing of sensors and actuators with Arduino Boards**
  - Gain knowledge of Arduino hardware, types of boards, and their capabilities for IoT development.
- **Interfacing sensors/actuators, wireless connectivity (Wi-Fi, BLE) with ESP32**
  - Basic IoT security considerations

Learning Outcomes:

After successful completion of the module, the students shall be able to:

- Student will understand the basic difference between microprocessor and micro-controller, different types of microcontroller boards.
- Students will come to know about the fundamentals of Internet of Things(IoT) - applications, protocols, use-cases
- Students will be able to understand the IoT ecosystem, basic building blocks of IoT.
- Student will learn about the different types of Arduino boards /ESP32 in brief.
- Students will differentiate sensors, transducers, and actuators, and understand their principles.
- Students will perform hands-on interfacing of digital/analog sensors and actuators with wireless features.
- Students will implement basic secure communication in IoT prototypes. Students will learn and do hands-on in interfacing digital and analog sensors with Arduino Uno

NOS-3: Conceptualising IoT based use-cases

Duration: 60 Hours

Objective:

The objective of the course is to provide a thorough understanding about and hands-on practice with Ardunino UNO Board.

Description:

- **Understand the concepts of IoT-based smart systems and their applications in daily life. (Ex. Smart Street Light control)**
- **Learn the components and working principles of IoT devices for home automation systems. (Ex. Home automation using Arduino)**
- **Explore the design and functionality of password-enabled IoT systems for security. (Ex. Password enabled Digital)**
- **Smart environmental monitoring (e.g., air quality, temperature with alerts)**
- **Cloud Based Smart Irrigation System (e.g. Soil Moisture, Soil Temperature with Real-time monitoring)**

Learning Outcomes:

After successful completion of this module, students should be able to:

- Students will learn, how to make a prototype of Intelligent street light control using LDR, LED and Relay
- Students will learn, how to develop a home automation system using Bluetooth, PIR and Relay.
- Students will learn how to make a password enabled digital lock using keypad, LCD, buzzer.
- Students will prototype intelligent environmental monitoring systems using sensors and cloud/alert integration.
- Students will develop wireless home automation systems incorporating relays, sensors, and mobile control.
- Students will build secure password/biometric digital access systems with display and feedback.
- Students will apply basic edge decision-making in IoT prototypes for efficiency.

NOS-4: Fundamentals of wireless IoT using NodeMCU/ ESP32

Duration: 90 Hours

Objective:

The objective is to provide students and professionals with a comprehensive understanding of how to analyze and ensure the timing correctness of digital VLSI designs without relying on dynamic simulations.

Description:

Overview:

- **Fundamentals and architecture of wireless IoT**
  - Understand the fundamentals of wireless IoT architecture and its role in modern IoT systems. - Design and build wireless IoT systems using NodeMCU as the core platform.
- **TCP/IP modelling for IoT .**
  - Learn the TCP/IP model and its application in designing IoT communication protocols.
- **ESP32/NodeMCU as an Wireless IoT Platform.**
  - Explore NodeMCU as an IoT platform and its integration capabilities with cloud systems.
- **Fundamentals of cloud Platforms.**
  - Study cloud platforms and free cloud service providers for IoT implementation.(e.g AWS IoT, Google Cloud IoT, etc))
- **Implementation of cloud based IoT use cases.**
  - Implement end-to-end IoT use cases utilizing NodeMCU, sensors, and cloud platforms.
- **IoT security fundamentals**

Learning Outcomes:

After successful completion of the module, the students shall be able to:

- Students will understand wireless IoT architecture, edge computing, and TCP/IP layers.
- Students will apply modern protocols like MQTT for efficient communication.
- Students will build wireless systems using ESP32/ NodeMCU, interfacing sensors/actuators securely.
- Students will integrate with leading cloud platforms for data storage and visualization.
- Students will develop secure, cloud-connected IoT devices with monitoring and remote control.
- Students will implement basic security measures like TLS and device authentication.
- Student will be able to make IoT devices that can monitor the system using cloud platforms

NOS-5: Employability Skill

Duration: 60 Hours

Description:

Constitutional Values – Citizenship:

- Explain constitutional values, including civic rights and duties, citizenship, responsibility towards society, and personal values and ethics such as honesty, integrity, caring, and respecting others that are required to become a responsible citizen.
- Demonstrate how to practice different environmentally sustainable practices.
- Becoming a Professional in the 21st Century.
- Discuss relevant 21st-century skills required for employment.
- Create a pathway for adopting a continuous learning mindset for personal and professional development.

Basic English Skills:

- Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone.
- Career Development & Goal Setting
- Create a career development plan.
- Identify well-defined short- and long-term goals.

Communication Skills:

- Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
- Explain the importance of communication etiquette, including active listening for effective communication.
- Role-play a situation on how to work collaboratively with others in a team.
- Demonstrate how to behave, communicate, and conduct appropriately with all genders and PwD.

Financial and Legal Literacy:

- Discuss various financial institutions, products, and services.
- Demonstrate how to conduct offline and online financial transactions safely and securely and check passbook/statement.
- Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions.
- Discuss legal rights, laws, and aids.

Essential Digital Skills:

- Describe the role of digital technology in day-to-day life and the workplace.
- Create an email id and follow email etiquette to exchange emails.
- Show how to create documents, spreadsheets, and presentations using appropriate applications.

- Utilize virtual collaboration tools to work effectively.

Customer Service:

- Classify different types of customers.
- Demonstrate how to identify customer needs and respond to them in a professional manner.
- Discuss various tools used to collect customer feedback.
- Discuss the significance of maintaining hygiene and dressing appropriately.

Getting ready for Apprenticeship & Jobs:

- Draft a professional Curriculum Vitae (CV).
- Use various offline and online job search sources to find and apply for jobs.
- Discuss the significance of maintaining hygiene and dressing appropriately for an interview.

NOS-6: Project Work/OJT

Duration: 60 Hours

Description:

The students can select hardware & software projects. The project can be implemented using Arduino & ESP8266 with sensor,IoT Protocols , which students have studied and used during the course.

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