

PRE - REQUISITE AND ELIGIBILITY:

Pre – Requisite:

- ♦ Basic knowledge of Digital Systems and C programming will be preferred.
- ♦ Each participant should have computer system* with pre-installed necessary software**, Internet connectivity and smartphone.

* Minimum system requirements: i3 processor, 4 GB RAM, 500 GB HDD.

** Links will be provided to the participants with installation instructions.

Eligibility:

The course is open to all engineering and science faculties / students. Engineers and Scientists in R&D organizations and working professionals from industry are also encouraged to register.

CERTIFICATE CRITERIA:

- ♦ 85% Attendance is mandatory for receiving graded certificate.
- ♦ Attendance % will be indicated in the certificate.
- ♦ Based on online assessment and project demonstration, grades will be awarded.

REGISTRATION LINK: <https://forms.office.com/r/PTMm2yz4JE>
REGISTRATION FEES (WITH IoT DEVELOPMENT KIT AND SHIPPING)
: ₹ 10,000 /- (INCLUSIVE OF ALL TAXES)

PAYMENT LINK: <https://www.onlinesbi.com/sbicollect/icollecthome.htm>

Procedure:

State - Tamil Nadu >> Category - Educational Institutions >> Conference and Workshop NIT Trichy >> IoT System Design Course 2022 ICE >> Payment

LAST DATE FOR REGISTRATION: 13TH MAY 2022

Note:

Please include your **Full Name** and "**ICE_IoTSD**" in the **Remarks** during payment and please send the payment receipt to "ice.iotcourse2022@gmail.com". (Emailing receipts is mandatory to confirm your Participation).

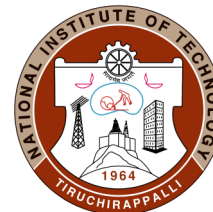
PRE-REGISTRATION QUERIES: <https://forms.office.com/r/thpPg6Z1qw>



CONTACT US:
MOBILE : +91 9677844200
EMAIL : ice.iotcourse2022@gmail.com



National Institute of Technology
Tiruchirappalli –15
Thanjavur Main Road, NH67, near BHEL,
Tiruchirappalli, Tamil Nadu 620015



**NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI - 15**

Thanjavur Main Road, Tiruchirappalli, Tamil Nadu

**DEPARTMENT OF INSTRUMENTATION & CONTROL
ENGINEERING**

In Association with

STEPS Knowledge Services Pvt Ltd., Coimbatore



**Own Your IoT
Development Kit**

CERTIFICATE COURSE

On

**INTERNET of THINGS
SYSTEM DESIGN**

Hands-on Course for 45 Hours in Online Mode
Between 25th May and 25th July 2022

INTERNET of THINGS

SYSTEM DESIGN

ABOUT THE COURSE:

Embedded systems are at the core of emerging technology. They sense, compute and control real-world signals based on the user requirements. The real world is analog, while the computations performed within the system are in the digital domain. Mixed signal involves both analog and digital interfaces in the signal processing chain. Add connectivity to this system for IoT. Internet of Things (IoT) is becoming ubiquitous with edge sensor nodes getting more and more intelligent and capable to transmit information directly to a cloud and also get controlled /actuated from the cloud. The pervasive nature of hooking anything to the internet, which was not thought previously, opens up a new era of imagination and deployment for a connected world with endless possibilities. Artificial intelligence (AI) makes it possible for smart devices to learn from experience data, adjust to new inputs and perform human-like tasks. This course with Hands-on working is structured and tailored to meet the need of the participants to get an experiential learning of IoT & AI-enabled systems and their applications. Typical applications could be battery-powered sensor signal acquisition, processing based on Artificial intelligence (AI) and connectivity to the Cloud.

COURSE OBJECTIVE:

- ◆ To provide an understanding of Internet of Things (IoT) and its envisioned deployment domains with OTA options.
- ◆ To impart Hands-on experience in the design and development of IoT systems with cloud dashboards and security challenges.
- ◆ To review and compare the various protocol standards deployed in the Internet of Things (IoT) domain and to make informed choices.
- ◆ To offer an understanding of AI & Wireless Sensor Network implementation .

HARDWARE SPECIFICATION:

<ul style="list-style-type: none">◆ Xtensa® LX6 32-bit Dual-Core @ 160 / 240 MHz◆ 448 KB ROM 520 KB SRAM 4 MB Flash◆ 2.4 GHz Wi-Fi, Bluetooth and BLE◆ Programmable GPIOs◆ Multi channel 12-bit SAR ADC◆ 2 ×8-bit DAC◆ SPI I2C UART USB host◆ Network Protocols: IPV4, IPV6, SSL, TCP/UDP/HTTP/FTP/MQTT◆ User Configuration: AT Instruction Set, Cloud Server, Android / IOS APP◆ Encryption: AES/RSA/ECC/SHA-2◆ 1024 bit OTP secure boot◆ Working voltage 3.3 V	<p>Built-in Interfaces</p> <ul style="list-style-type: none">◆ USB Interface◆ OLED Graphics Display◆ SD card slot◆ Wi-Fi & BLE interface◆ UART (RS232 @ 3.3 V / RS485 / MODBUS)◆ 3-Axis Digital Accelerometer◆ Digital Temperature & Humidity Sensor◆ PIR Sensor for motion detection◆ Analog Temperature & Light Sensor◆ RGB LED, 3x3 keypad matrix, Potentiometer◆ Op Amp AFE (I-V, PGA, Buffer, Comparator)◆ Darlington Transistor Array @ 500mA <p>Pluggable connectors for</p> <ul style="list-style-type: none">◆ LoRa & Zigbee◆ Ultrasonic Sensor◆ Stepper / DC motor / Relay◆ 16 x 2 Alphanumeric LCD◆ Additional I2C & SPI <p>Optional</p> <ul style="list-style-type: none">◆ CAN , RS232, Qwiic interface
---	--

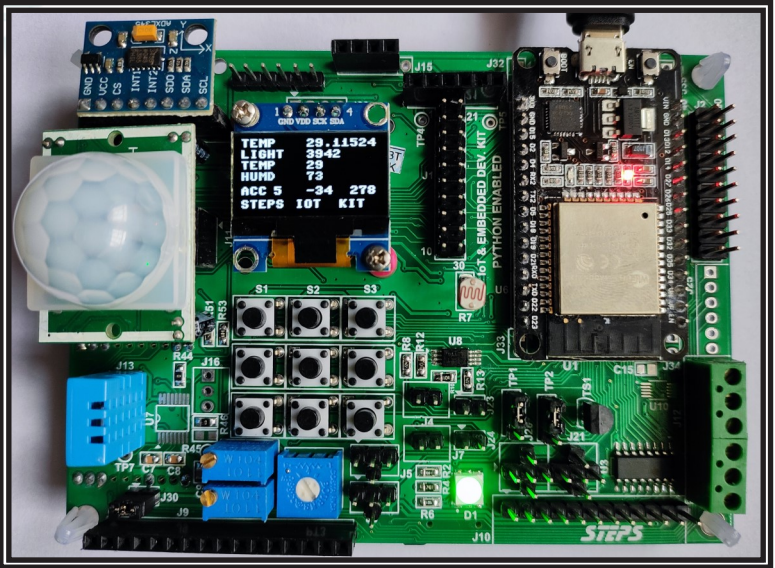
HANDS-ON SESSION:

- Blinking LEDs, Keypad, interrupts
- Working with Timers, ADC, DAC and PWM
- Communicating with UART, SPI, I2C, RS485
- UI creation with OLED and SD card storage
- Hands-on with onboard sensors and actuators
- Creating Webserver and designing web page using HTML
- Implementing IoT System using HTTP protocol and visualizing data through cloud
- Publish / Subscribe messages to other IoT clients using MQTT cloud broker
- Alert services with E-mail and SMS
- OTA web updater

HARDWARE PLATFORM	Hands-on will be done using STEPS IoT Development kit containing 32 bit dual core processor, Wi-Fi, BLE, USB, OLED, sensors for IoT System Development & Applications
PROGRAMMING PLATFORM	Python, Embedded C - Arduino API

{ Each participant will be provided with this IoT Hardware kit }

STEPS IoT DEVELOPMENT KIT



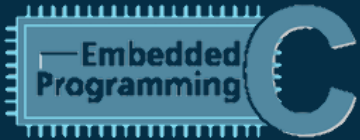
PYTHON

Python is a programming language with standard library and community — contributed modules that allow for many possible applications.



MicroPython

MicroPython is a compatible Python Compiler and Run-time that is optimized to execute on embedded systems.



EMBEDDED C PROGRAMMING

Embedded C is the most popular language among Embedded Programmers for programming Embedded Systems. It is a hardware dependent programming.



ARDUINO

Support for open-source Arduino Software (IDE) making it easy to write code and upload it to the board.