

3 Months (80 Hrs)

Course Curriculum

Online Certification In
Basic Embedded System and IoT

By E&ICT Academy, IIT Guwahati

ABOUT THE

IIT GUWAHATI



Indian Institute of Technology Guwahati, the sixth member of the IIT fraternity, was established in 1994. The academic programme of IIT Guwahati commenced in 1995. At present the Institute has eleven departments and three inter-disciplinary academic centres covering all the major engineering, science and humanities disciplines, offering BTech, BDes, MA, MDes, MTech, MSc and PhD programmes. Within a short period of time, IIT Guwahati has been able to build up world class infrastructure and a reputation for itself.

ABOUT

E&ICT ACADEMY, IIT GUWAHATI



Electronics and ICT Academy aims to provide specialized training to the faculties of Engineering, Arts, Commerce, Science colleges and Polytechnics institutes by developing short term training programmes on fundamental and advanced topics in IT, Electronics & Communication, Product Design, Manufacturing. In addition, the Academy conducts specialized customized training programmes and research promotion workshops for corporate sector & educational institutions.



PROGRAM CURRICULUM: LEARNING PATH

Master **Industry- relevant skills for Basic Embedded System & IoT** through the most relevant curriculum designed by E&ICT Academy, IIT Guwahati and leaders from the industry.

C Programming and Data Structure

Module

01

C Basics, Control Statements, Loops, Memory Allocation, Functions, Arrays, Strings, Pointers, Structure and union, Linked-List, Tree, Graph.

Basic Embedded Systems

Module

02

Processor Architectures, Types of Microcontrollers, 8-bit/ 16-bit/32-bit Microcontrollers

NODEMCU(Esp8266)

Module

03

Install IDE Software, Programming of Nodemcu, Pinout of Nodemcu, Traffic Light Controller

Connectivity protocols (wired and wireless) and Sensors/Actuator

Module

04

UART/USART, SPI, I2C, Wifi, BLE, USB, ADC,Ultra Sonic Sensor, Smoke Sensor, Gyroscope Sensor

IOT Protocols

Module

05

HTTP/REST, MQTT, COAP

IOT cloud services

Module

06

IoT Cloud Architecture, SAAS, PAAS, IAAS, Thingspeak cloud, Google Firebase

Network Layered Architecture Communication

Module

07

OSI model, TCP/IP model, Ipv4 and Ipv6, Wireless sensor networks

COURSE CURRICULUM

C Programming and Data Structure

01

Module-1: C Programming and Data Structure

- | | |
|-------------------------------------|------------------------------|
| a. Keywords and Data types | m. Volatile |
| b. Operators | n. Enumeration |
| c. Flow control | o. Structure and union |
| d. Loops | p. File handling concepts |
| e. Memory allocation | q. Dynamic memory allocation |
| f. Storage class | r. Command line arguments |
| g. Functions | s. Data structures |
| h. Arrays | t. Linked-list |
| i. Sorting and searching techniques | u. Tree |
| j. Strings | v. Graph |
| k. Pointers | |
| l. Function pointer | |

Hands-on :

Practical use of C Programming and Data Structure

Basic Embedded Systems

02

Module-1: Basic Embedded Systems

- a. What is Embedded System?
- b. What is Microprocessor?
- c. Processor Architectures
- d. Difference between microprocessors and microcontrollers
- e. Types of Microcontrollers
- f. 8-bit/16-bit/32-bit Microcontrollers
- g. Programming Languages for Embedded system

Module-1: NODEMCU(Esp8266)

- a. Install IDE Software
- b. Programming Of Nodemcu
- c. Pinout of Nodemcu
- d. Programming Of Nodemcu
- e. Bi-Directional Visitor Counter
- f. Traffic light controller

Module-1: Connectivity protocols (wired And wireless) and Sensors/Actuators

- a. UART/USART
- b. SPI
- c. I2C
- d. Wifi
- e. BLE
- f. USB
- g. Sensors

Module-2: Sensors

- i. Sensors types-analog and digital
- ii. Temperature/humidity sensor
- iii. Ultrasonic sensors
- iv. Photoresistor
- v. Smoke sensor
- vi. Gyroscope sensor
- vii. Accelerometer
- viii. OLED display

Hands-ON (Connectivity Protocols)

- a. Car reverse parking alert system
- b. NodeMCU Internet clock with OLED display
- c. Smoke detection alert system
- d. Intruder detection system

IoT Protocols

05

Module-1: IoT Protocols

- a. HTTP/REST
- b. MQTT
- c. COAP

IOT Cloud services

06

Module-1: Iot Cloud Services

- a. IoT Cloud Architecture
- b. IoT Cloud services
 - SAAS
 - PAAS
 - IAAS
- c. Thingspeak Cloud
- d. Google Firebase

Network Layered Architecture Communication

07

Module-1: Network Layerd Architecture Communication

- a. OSI model
- b. TCP/IP MODEL
- c. IPv4 and Ipv6
- d. Wireless sensor networks
 - i. Layered Network Architecture
 - ii. Clustered Network Architecture

Hands-On Network packet analysis using Wireshark

Learn from one of the best faculty in India through live online sessions. While Academic Professors will help you learn Embedded & IoT concepts, industry experts will impart practical knowledge of Embedded System, IoT & Network Layered architecture through real world projects.



TOOLS, LANGUAGES & FRAMEWORKS

				
				
				



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