



GOVERNMENT OFFICIALS TRAINING PROGRAM ON INTERNET OF THINGS



ABOUT FUTURESKILLS PRIME

FutureSkills Prime is a joint initiative by the Ministry of Electronics & Information Technology (MeitY) and the IT Industry led by The National Association of Software and Service Companies (NASSCOM). The program is being extended under the Government of India's flagship Champion Service Sector (CSS) Scheme.

ABOUT GOVERNMENT OFFICIALS TRAINING

Government Officials Training Program is especially designed for Government Official to provide an understanding of Internet of Things and its applications in various domains to the Government Officials. The course also details the technical insights to the Government officials involved in planning and RFP preparation.

WHAT YOU WILL LEARN

On successful completion of the course, a person will develop experience on working with the INDUS-IoT kit. The person will understand the basics of IoT with reference to a case study and will develop insights into

- microcontroller programming on INDUS-IoT kit including peripheral configuration like like ADC, DAC, timers (PWM) and different Serial Communication protocols including SPI, I2C, UART.
- Understanding of working of sensors & actuators depending on use cases
- Interfacing analog sensor and digital sensors using inbuilt ADC and peripherals like UART, SPI, I2C
- Know-hows of TCP-IP protocol stack in practice
- Interfacing network peripherals to setup Wi-Fi and BLE based networks
- Hands-on on wireshark for Wi-Fi and Bluetooth packet
 analysis
- Write RESTFul Web services which produces response in the form of JSON or XML.
- Setup complete MQTT Architecture with the capabilities to send data between devices.
- Understand working of application layer protocols like CoAP and MQTT.
- Understand Edge Computing & its advantages in IoT, knowledge on various IoT platforms.

WHO CAN PARTICIPATE

- IT/ITeS and related areas employees from Government Departments, State/Central Government Organizations, and PSU/Autonomous Institutes.
- Knowledge of C programming, microprocessors and microcontrollers and basics of Java.

CERTIFICATION

• On successful completion of the course, the participant will be provided with Certificate of Completion

VENUE:

• Online

COURSE FEES

• Free for Government Officials

COURSE DURATION

• 30 hrs + Assessments

REGISTRATION PROCESS

Send the attached completed nomination form to Ms Priyanka Sinha (priyankasinha@cdac.in) and Mr Mohan P (mohanp@cdac.in)





COURSE SYLLABUS

Fundamental of IoT

- Section 1:
 - Government department specific case study: problem statement
 - Introduction to IoT: Working principle of Internet, brief history & Evolution of IoT
 - $\circ~$ How IoT solves that above mentioned problem statement
- Section 2:
 - Reference Architecture of IoT & data flow model of IoT
 - IoT Functional Blocks sensors, actuators, IoT nodes, gateway, cloud, IoT platform, data analysis (Explained with reference to government department specific problem statement)
- Section 3:
 - Challenges in IoT: Power consumption, Physical security, durability, Secure Connectivity, Secure Data Storage, Volume, Scalability (Explained with reference to government department specific problem statement)
 - Other Use Cases of IoT (with reference to IoT functional blocks)

Introduction to Microprocessors and Microcontrollers

- Introduction to MCU Families Overview of ARM Cortex-M architecture and CMSIS standard
- Development environment Eclipse, arm-gcc, Building phases
- Clock, Timer Management, Low power modes, RTC, Interrupts
- Introduction to Peripherals
- Serial protocols UART, SPI, I2C
- ADC and DAC
- Introduction to Debugging JTAG

Sensors & Actuators required for various IoT applications

- Sensors and actuators for different IoT use cases
- how to choose sensors and actuators considering field limitations
- Sensor calibration and maintenance issues

Wireless Technologies:

- TCP/IP Model- WLAN (IEEE 802.11 standard)
- IEEE 802.15.4 Wireless PAN standard ZigBee/6LoWPAN
 Introduction to 6TiSCH (if needed by government office)
- Bridging IP networks Bluetooth/BLE Basics
- Cellular Technologies
- Modbus over TCP/IP (if needed by government office)
- Short range communications: RFID- NFC
- Wireless Low Power Wide Area networks
- Location Tracking GPS

Data Exchange Protocols

- Communication Models Request-Response; Publish-Subscribe; Peer to Peer
- Data Exchange Formats XML & JSON
- MQTT Protocol, RESTFul Architecture, HTTP REST Model, CoAP Protocol
- IoT security
- Gateway Design & Characteristics
- Principles of Edge Computing
- IoT platforms (An introduction to cloud, data visualization and analytics for IoT)

IoT Demos

REGISTRATION PROCESS

<u>Annexure – XVII</u>

Nomination Form – Government Officials Training Programme

Training Programme Details:

Name of the Training Program	Government Officials Training Program in Internet of Things
Name of The Technology	Internet of Things
Resource Centre Name	C-DAC Bengaluru
Date of Training	

Personal Information of Trainee:

NAME	
Prof./Dr./Mr./Ms.	
DESIGNATION	DEPARTMENT
DATE OF BIRTH	GENDER (M / F)
AADHAAR NO.	
CONTACT NUMBER &	
EMAIL	
NAME OF THE	
ORGANIZATION	
COMPLETE ADDRESS /	
CONTACT NUMBERS /	
E-MAIL OF THE INSTITUTE	

Educational / Professional Qualifications:

EDUCATIONAL / PROFESSIONAL QUALIFICATIONS (GRADUATION ONWARDS)					
SL. NO.	YEAR	DEGREE	UNIVERSITY / INSTITUTE		

RESEARCH / TECHNICAL EXPERIENCE					
SL. NO.	YEAR	AREA OF EXPERTISE	CENTRE		

Signature of Official

Recommended / Not Recommended (By the Head of the Institute)

> (SIGNATURE OF HEAD OF INSTITUTION) Name & Designation with Seal