

Get End-to-End IoT Training by hIOTron® IoT  
Developers who built successful IoT solutions  
Already, Not just Trainers.

In-Depth corporate IoT Training based on hands on practically  
understanding of core end-to-end IoT architecture & 5+ Live  
Industrial IoT Use-Cases using open sources IoT Hardware Kit &  
Custom/Enterprise/Open source IoT Cloud Platforms & Dashboard/  
Mobile Applications.



**End-to-End Corporate IoT Training Brochure**

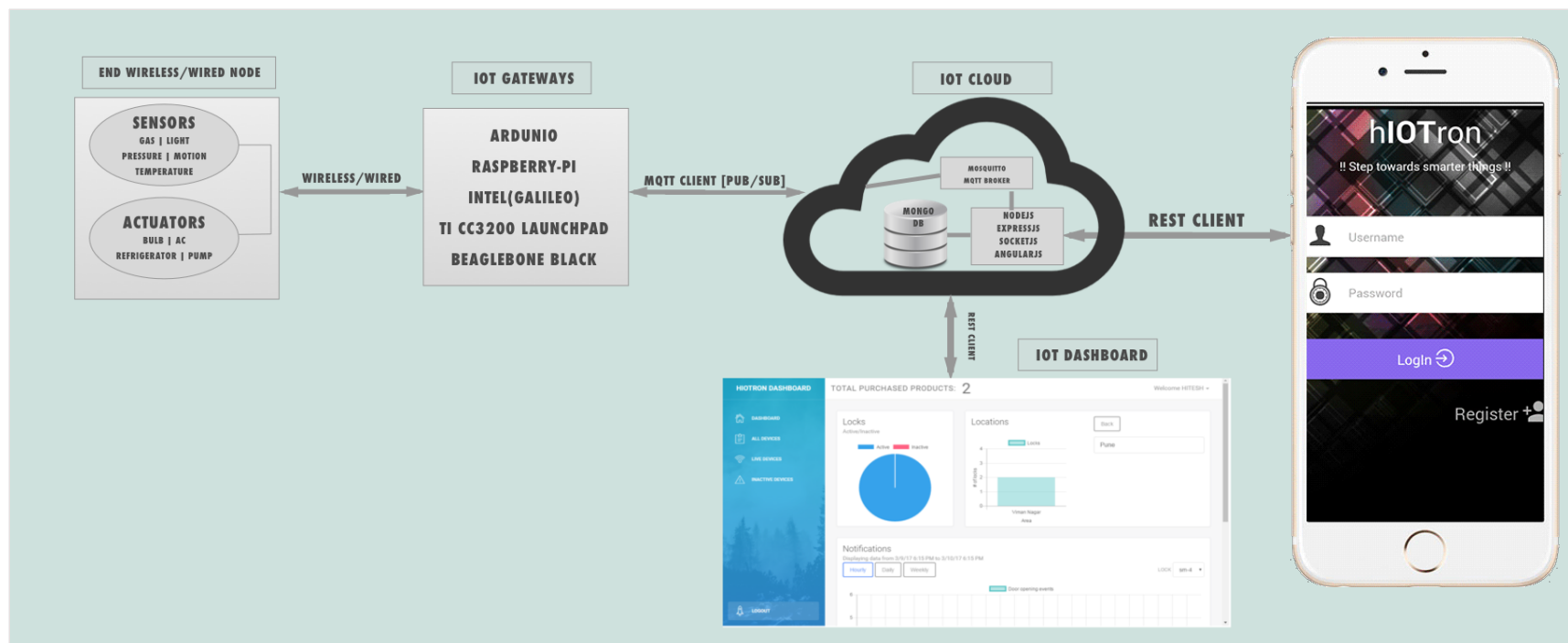
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# What exactly is the Internet of Things?

The Internet of Things (IoT) is the next wave, world is going to witness. Today, we live in an era of connected devices (mobile phones, computers etc.), the future is of connected things (Things mean: home appliances, vehicles, lamp-posts, personal accessories, your pets, industrial equipment's and everything which you use in day-to-day life). Internet of Things is a term given to the attempt of connecting objects to the internet and also to each other - allowing people and objects themselves to analyze data from various sources in real-time and take necessary actions in an intelligent fashion.

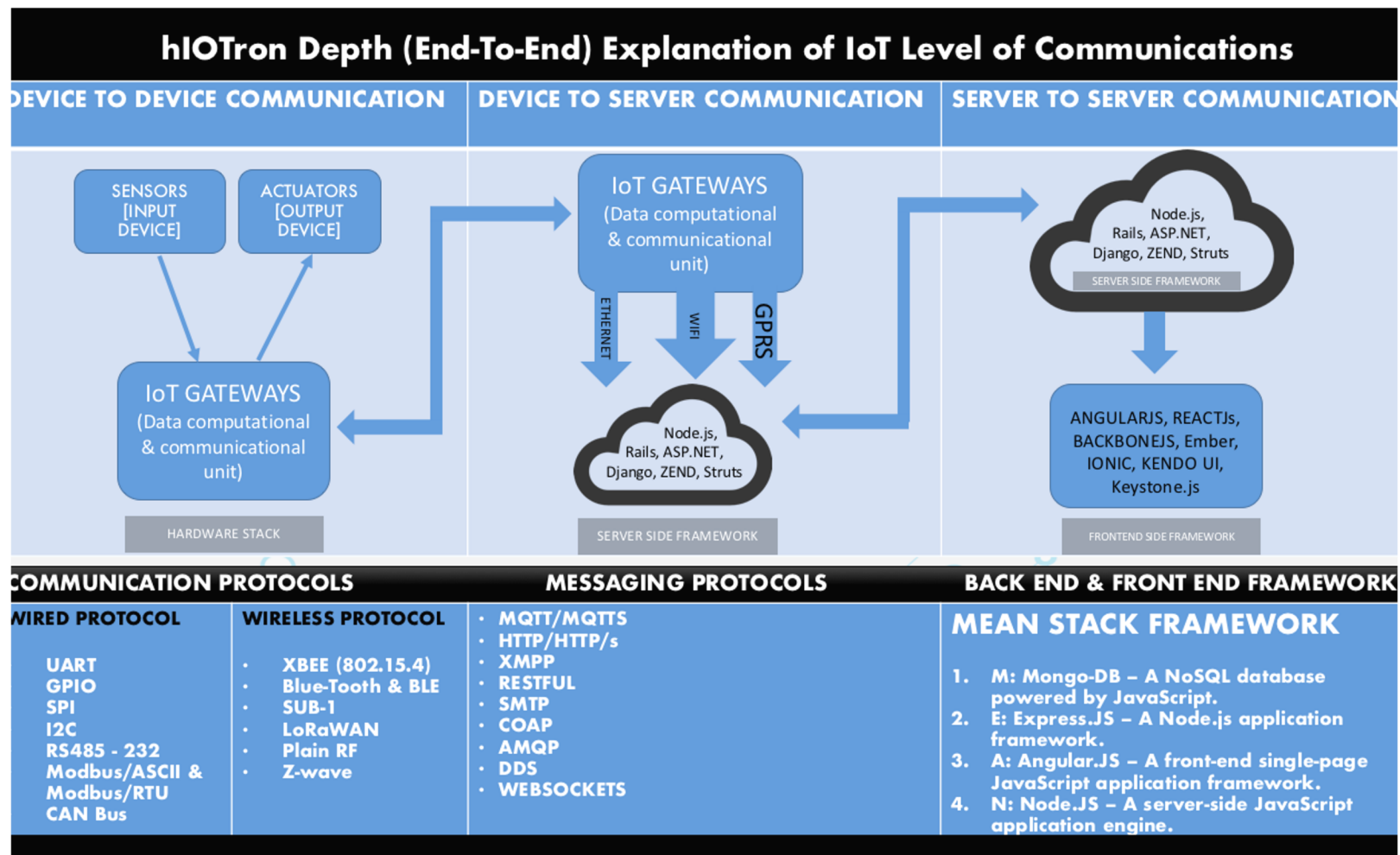


## 60 Hours Hands IoT Training Agenda

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# End-To-End IoT Architecture & Course Curriculum



DAY	SESSION	TITLE	DESCRIPTION
1	Session-1: 3 Hours [Theory]	Introduction & Basics of IoT (Internet of Things)	<ul style="list-style-type: none"> <li>□ End-To-End IOT Architecture with detailed explanation</li> <li>□ IOT Application or Use-Case with IOT Analytics</li> <li>□ IOT Market Landscape/Business or JOB opportunities in detail</li> <li>□ Availability of Readymade IOT Hardware + Software + Platform solutions</li> <li>□ Top 10 IOT Influenced Companies and their solutions in detail</li> </ul>
	Sesion-2: 3 Hours [Theory & Practical]	Detailed & Logical End-To-End IOT architecture in terms of Device to Device [D2D], Device to Server [D2S], Server to Server [S2S] communication.	<p><b>Device to Device [D2D] communication</b></p> <ul style="list-style-type: none"> <li>□ Understanding of Various Analog/Digital sensors (like Temperature, Light, Humidity, IR, Ultrasonic, moisture, current etc.), Classification &amp; selection criteria based on nature, frequency and amplitude of signal.</li> <li>□ Embedded Development Boards – Arduino, Raspberry Pi, Intel Galileo, ESP8266 (Node-MCU) etc.</li> <li>□ Interfacing peripherals &amp; Programming GPIOs – Input/output peripherals &amp; their Design Considerations –Cost, Performance &amp; Power Consumption tradeoffs.</li> <li>□ What are wireless &amp; wired communication protocols and understanding for each.</li> <li>□ How sensors/actuators/RFID/GPS Nodes are connected to IOT gateway and why IOT gateways are required rather than sending data directly to cloud through each sensor nodes.</li> </ul> <p><b>Device-To-Server [D2S] communication</b></p> <ul style="list-style-type: none"> <li>□ What are the communication channels &amp; how to prioritize them with respect to network requirement?</li> <li>□ What are messaging protocols &amp; where they reside on TCP/IP stack model &amp; what are their importance in terms of device to server communications with live example?</li> <li>□ What are available server-side frameworks &amp; Why node.js for real time IoT data with some use cases and how to work with MQTT/REST API's on server?</li> <li>□ How to store data in NOSQL [MongoDB] database?</li> </ul> <p><b>Server-To-Server [S2S] communication</b></p> <ul style="list-style-type: none"> <li>□ How to pass data from backend [Server] to front-end [Client] using REST API's</li> <li>□ What are front end framework or REST clients [Mobile App/Dashboard]</li> </ul>

2,3,4	Session-3-8: 18 Hours [Practical]	Live Hands on Practical using Sensors/Actuators, Arduino, Ethernet shield, Wi-Fi (Node-MCU and other accessories)	Sr. No.	Industrial Application	Connectivity Protocol	Communication Channel	Messaging Protocol	Cloud Platforms
			1.	Environmental Application	GPIO(Wired)	Ethernet	REST/Web-socket	THINGSPEAK PLATFORM
			2.	Energy & Industrial Application	BLE4.0/Bluetooth(Wireless)	Wi-Fi	SMTP/REST/WEBSOCKET	BLYNK IOT PLATFORM
			3.	Enterprise & Health Care	GPIO(Wired)	Ethernet	REST/MQTT/Web-sockets	THINGWORX IOT PLATFORM
			4.	Smart City	GPIO(Wired)	Ethernet/Wi-Fi	REST/MQTT & Web socket	HIOTRON IOT PLATFORM
5	Session-9,10: 6 Hours [Theory & Practical]	Build your first End-To-End IOT product using Raspberry pi device	<ul style="list-style-type: none"> <li>● <b>Getting started with Raspberry-Pi:</b> Raspberry-Pi Hardware Description &amp; Interfacing Components + Booting + Wi-Fi/Bluetooth setup + Accessing the Pi + Rasp-Bean OS (Linux) + basic commands + SSH (Putty/X-Ming)</li> <li>● <b>Raspberry-Pi interfacing &amp; python programming:</b> Multi-session + Playing with python (Arithmetic Conditions + Loops + functions) + Analog/Digital sensor (Input) interfacing with GPIO's + Actuator (Output) interfacing</li> <li>● Real time Data monitoring on multiple Thing-speak channels from Raspberry-pi.</li> </ul>					
6 & 7	Session-11-14: 12 Hours [Practical]	Hands on practical's with IoT Gateway (Raspberry-Pi) on Industrial/Enterprise IoT Platform	Sr.No.	Industrial Application	Connectivity Protocols	Communication Channels	Messaging Protocols	IoT Cloud Platform
			1	Smart Home Automation	Wireless (LORA)	Ethernet/Wi-Fi	MQTT/REST	AWS IOT Platform
			2	Energy & Power management	Wired (Serial)	Ethernet/Wi-Fi	MQTT/REST	IBM Blue-mix Watson

8	Session-15,16: 6 Hours [Practical]	Setup MQTT Broker & Node server on Raspberry-Pi device	<b>[Backend IoT MQTT Server = Broker + Nodejs] on Raspberry-Pi</b>  Part-1 = Setup Broker & Test <ul style="list-style-type: none"><li><input type="checkbox"/> Install Hive-MQ/Mosquitto Broker (MQTT) on Raspberry-pi</li><li><input type="checkbox"/> MQTT Fx, virtual client to client communication</li></ul> Part-2 = Setup Node & Test <ul style="list-style-type: none"><li><input type="checkbox"/> MEAN stack: Install MongoDB, Express.js, Angular.js &amp; Node.js.</li><li><input type="checkbox"/> Other NPM dependencies: Install some other NPM dependencies such as Sokcet.io (A web-socket Framework), body-parser, mongoose etc.</li><li><input type="checkbox"/> Perform REST Basic APIs operation (PUT/GET/DELETE/POST).</li></ul>					
9	Session-17,18: 6 Hours [Practical]	Develop Angular Dashboard & Hybrid Mobile Application for [Android/iOS] platform & store data in NOSQL [MONGODB] database.	<b>[Frontend Clients = Angular Webpage or Mobile Application] on Raspberry-Pi</b>  Part-1 = Build Angular Webpage & Store Data in MongoDB (NoSQL) database <ul style="list-style-type: none"><li><input type="checkbox"/> Build first Node App using express with Node-mon.</li><li><input type="checkbox"/> Use socket.io for real time client-server connectivity for IoT data.</li><li><input type="checkbox"/> Push/Fetch real time or historical data to or from MongoDB (NoSQL) database</li></ul> Part-2 = Build Hybrid Mobile Application for [Android/iOS/Windows] platform & Store Data in Database <ul style="list-style-type: none"><li><input type="checkbox"/> Build first Hybrid App using Ionic angular framework.</li><li><input type="checkbox"/> Use socket.io for real time client-server connectivity for IoT data.</li><li><input type="checkbox"/> Push/Fetch real time or historical data to or from MongoDB (NoSQL) database.</li><li><input type="checkbox"/> Build Platform specific APK [Android/iOS]</li><li><input type="checkbox"/> Publish production app on Google play-store or iOS store.</li></ul>					
10	Session-19,20: 6 Hours [Practical]	End-To-End IoT applications (Optional) using MQTT/REST IoT platform on rasp-berry.	<b>Sr. No.</b>	<b>Industrial Application (Optional)</b>	<b>Connectivity Protocols</b>	<b>Communication Channels</b>	<b>Messaging Protocols</b>	<b>IoT Cloud Platform</b>
			1.	Agriculture, Oil & Gas, Aviation, Energy & Power, Industrial IoT Logistics, Consumer electronics	Wireless (LORA)	Wi-Fi Ethernet/GPRS	MQTT/HTTP Web socket	RPI Custom IoT platform



# What Core technologies will be covered?

1. Sensors: Temperature, Luminance, Infrared, Gas, Current, Ultrasonic, PIR, Accelerometer.
2. Actuators: LED's, Bulb with Relay, Motors, Fan etc.
3. Connectivity Protocols:
  - Wired: CAN bus, GPIO ADC, Serial, MOD bus, SPI, I2C
  - Wireless: Zig-bee, LORA, BLE 4.0, Wi-Fi, RF module
4. Hardware (Middleware/IoT) Gateway: Node-MCU, Arduino, Raspberry-pi-3 etc
5. Communication Channels: Wi-Fi, Ethernet, GSM / 3G / 4G / LTE (SMS, Phone Calls, Data)
6. Messaging protocols: MQTT, HTTP/HTTPS/REST, SMTP, AMQP etc.
7. IoT cloud Platforms: Thing-Worx, Thing-speak, AWS IOT, IBM Blue-mix Watson and private AWS instance etc.
8. Scripting: C/C++, Java & Python (to program embedded devices like Arduino, Node-MCU and Raspberry-Pi 3) for sensor & actuator control, Data Acquisition/Aggregation/Filtering/Analytics, Event Management, Network communication
9. Security:
  - Fully Encrypted Network Communication (SSL/TLS)
  - User Access Authentication Trusted Boot (where CPU/SoC supports it)
  - Encrypted Data Storage (AES256)
  - TPM keys used if available
10. MEAN Stack:
  - Server-Side Framework – Node.js [Express]
  - Database – Mongo-DB
  - Front End Development – Angular.js Webpage
  - Mobile Application – Android/iOS/Windows [Hybrid Platform]
11. Use Cases Covered:
  - Energy & Industrial
  - Enterprise & Health Care
  - Environmental Application
  - Smart Cities
  - Smart Home & Building Automation

## What Benefits participant will get?

1. Well systematically organized core IoT technical content in lowest market price.
2. Learn by hIOTron core IoT product-based domain-oriented expert.
3. More than 5 Live industrial IoT case studies on AWS IoT cloud platform.
4. Industrial level practical approach only valuable & key points learning and understanding with 100% hands on experience rather than just creating IoT a hype.
5. Get minimum 6 month's jump start in IoT or if already started then move towards your first IoT product deployment with hIOTron IoT experts.
6. Get IOT Training certificate and free IoT kit worth INR 8500.
7. Be a part of hIOTron fast growing 5500+ IoT developer's innovators, enthusiasts and maker's community.
8. Get one-year free access of hIOTron IoT cloud platform with devices such as Arduino, Raspberry-Pi and Node-MCU and Mobile App Free SDK's & Life-Time free access of online videos & software
9. Get 100% job assistance or an Opportunity to work in hIOTron IoT R&D Lab

## What will be the Hardware kit

BASIC KIT	ADVANCE KIT
<ol style="list-style-type: none"><li>1. Arduino Uno [At-mega 328] with USB cable</li><li>2. Ethernet Shield</li><li>3. W5100Bluetooth module (HC05)</li><li>4. Ultrasonic sensor (HCSR04)</li><li>5. Temperature sensor (LM35)</li><li>6. Luminance Sensor (LDR)</li><li>7. IR sensor Module</li><li>8. Gas Sensor Module [MQ2]</li><li>9. DHT11 Sensor Module</li><li>10. 2 channel relay Board</li><li>11. Light Bulb with Holder &amp; connector</li><li>12. Bread Board</li><li>13. M2M &amp; M2F jumpers</li><li>14. LED's and Resistors/Capacitors</li></ol>	<ol style="list-style-type: none"><li>1. Raspberry- Pi 3 model B</li><li>2. LORA Wireless Module</li><li>3. LORA Breakout Board</li><li>4. NODE-MCU Wi-Fi Module</li><li>5. SD Card [8GB]</li></ol>

## Our Training & Industrial Clients



**TATA MOTORS**



**BIOENABLE**

Identify - Automate - Track

**TATA TECHNOLOGIES**



**Deloitte.**



**verizon**

**ISYX**



**logitech**



## About hIOTron

hIOTron is the leading custom IOT solution enabler in APAC [Asia-Pacific] region which provides ready to market IOT enabled products in shortest period of time with 100% customer satisfaction.

We are IOT experts providing End-To-End IOT solutions that improve processes, differentiate products and services, and create new revenue streams.

At hIOTron we have always looked at sharing our ground practical experience of IOT product development with engineers in industries and in colleges. Starting from September, 2013 hIOTron has conducted over 650 Corporate and Academic Training programs on IoT based on (Arduino, Raspberry Pi, Intel Galileo) for engineering students and working professionals from TTL (TATA Technologies Limited), TATA motors, PSL (Persistence Systems Limited), Wipro, cognizant, IBM, Deloitte, Logitech and many more IT industries.

But we believe one of our biggest achievements is we have trained more than 22000 engineering students and 12500+ professionals from different industries as part of this Training.

## Specialization

1. Connectivity: Wi-Fi, ZigBee (Star/Mesh), Z-wave, LORA, Bluetooth, BLE 4.0, IR, NFC, RFID etc.
2. Semiconductor: Freescale, Marvell, Atmel, TI, Microchip & Many more.
3. Communication Channel: Wi-Fi, Ethernet, GSM/GPRS, GNSS, LTE.
4. Cloud Platforms: AWS, IBM Blue-mix Watson, xively, Thing-Worx, hIOTron & Private.
5. Communication & Queuing Protocols: MQTT, REST, Web-sockets, COAP, XMPP, AMQP.
6. Databases: Cassandra, MongoDB, Raven DB, MySQL, Oracle, MS-SQL.
7. Mobile: Android, iOS, Windows 10.
8. Standards: OPENIoT, Home Kit, Thread, Nest, AllJoyn, Brillo & Weave.

## Why hIOTron

Training Details	Training Institute-A	Training Institute-B	Training Institute-C	hIOTron® (An IoT Solution Enabler)
Training Mode	Online	Classroom	Online	Both (Classroom & Online)
Technical Content	Basic	Advance	Basic	Full-Stack (End to End)
Hardware Kit	Custom Hardware hence no learning scope in future	Advance kit (Major components includes Arduino Mega, RPI-3, Sensors, Actuators & other accessories)	Basic Kit (Major components includes Arduino-UNO, Node-MCU, Sensors, Actuators & other accessories)	Advance kit (Major components includes Arduino-Uno, Node-MCU, RPI-3, LORA & BLE modules with breakout, 10+ Sensors, Actuators & other accessories)
Hands-on Practical's	Basic (Support Online)	Intermediate (Task based)	Basic (Support Online)	End-to-End (5+Industrial Live Industrial real-time problem based IoT Case Studies)
Training Approach	Theoretical Demonstration.	Practical up-to certain level	Theoretical & Practical Demonstration	Industrial approach, only valuable & key points for IoT learning with Actual Hands-on experience.
Trainers Background	12+ Years' experience in training other courses & IoT	5+ Years' experience in training other courses & IoT	10+ Years' experience in training other courses & IoT	7+ Years' experience in training & developing only & only IoT products
Reviews	Only on website no Backlink of reviewer	On google but reviewer only students no industrial professionals	Only on website no backlink of reviewer	On Websites & Google both with their backlink of LinkedIn profile.
Cost	High	Low	Very High	Moderate

# Thousands of Working Professionals Have Taken hIOTron® Corporate IoT Training

Highly impressed by the depth of technical knowledge on IOT hardware of the team and especially Mr. Hitesh. Always ready to discuss any topic/query at length and ensure that it is addressed to satisfaction. Wish Hitesh and team all the success in this field.

**Shitalkumar P Panse,**  
**Vice President - Voice Engineering**  
**TATA Communications Ltd Mumbai**



I took the 60 Hours End-To-End Hands on IOT training with Hiotron and appreciate the patience with which they took me through the IOT concepts as I am not from the IT or electronics domain but fascinated to learn IOT as part of my personal and future career development. The trainers have motivated me to pursue this course with more conviction in myself and also showed the path to continued improvement and eventually success in the future. In fact, this course is not the end but just the beginning in my IOT journey.

**Shafali Kapoor, Senior**  
**Proposal Engineer Pune, India**  
**Oil & Gas | Black & Veatch**



I have opted for IoT Training in Pune and have been thought by Mr. Hitesh & Umesh. They are having brilliant practical knowledge of IoT. They are technically very sound, also having good understanding of the IoT business landscape. I enjoyed working and learning from hIOTron.

**Arun kumar Nair**  
**Technical Head | Big Data Analytics**  
**MSys Tech India Pvt. Ltd. | Pune**



hIOTron is the best for starting your IOT journey. They give a good iot training with practical hand-on. I really appreciate their vision and knowledge in IOT sector which will shape the future in a better and a convenient way in our everyday lifestyle. I hope and wish the success of their goals and vision for the future.

**Manoj Sawant,**  
**Chief Information Officer (CIO)**  
**MAN Trucks India Pvt Ltd**  
**India Pune**



hIOTron is one of the pioneers IoT Training providers, who are teaching the IOT with proper case studies. More practical and less theory. All the case studies are practical in nature which can be applied in industry. hIOTron provide Well organized IoT training software & documents and my all the queries has been answered and solved by trainer.

**Paul Lalthuamsanga**  
**Associate Solution Architect**  
**KPIT | India Pune**



Kudos to hIOTron Development & Training team! It was really thought-provoking, insightful, and well-structured end-to-end IoT framework (far better than even mentioned online) delivered by hIOTron. I personally worked on different Use Cases & its detailed understanding. Corporate interface of hIOTron is really excellent, without which i would not have been placed on a position where i am today. Thank you so much.

**Deepak Andore**  
**IoT Solution & Channel**  
**Partner at IOT Startup**



## Trainers Profile

- ❑ 7.5+ years' vast industrial experience in delivering end-to-end IoT solutions right from custom designing/manufacturing the hardware/PCB to application oriented mobile application & dynamic dashboard connected with most innovative for devices hIOTron IoT™ platform.
- ❑ Responsible for handling team of 32 developers working on various IoT technologies at hIOTron mainly embedded (Hardware & Software), Network engineer, Full stack developers, Mobility & Analytics specialist.

Hitesh Panjwani

CEO [Chief Executive Officer]



- ❑ 6+ years' vast industrial experience in delivering End-To-End IoT training to corporates as well as individuals.
- ❑ Specialties: Developing and testing of Hardware software, Industrial 4.0, Protocols, Wireless/Wired, Node.js, MQTT/REST, Application Ennoblement Platforms (AEP), Energy Management, smart Home Automation, Smart City, Smart Warehouse, Smart Building, Smart Hospitals, Smart Campus, Smart Store, Security, Health Care, Smart City, smart lock, smart hotel management etc.

Umesh Lokhande

Training Manager & IoT Developer





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## TERMS & CONDITIONS

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- ☐ Course Fee Includes GST 18%

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## REGISTRATION PROCEDURES

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- ☐ Confirmation of registration is online.

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## PAYMENT TERMS

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- ☐ Payment must be made prior to course commencement.

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