POTTI SRIRAMULU CHALAVADI MALLIKARJUNARAO
COLLEGE OF ENGINEERING & TECHNOLOGY
VIJAYAWADA - 520 001.
Approved by AICTE - ISO 9001:2015 Certified - Affiliated to JNTUK, Kakinada.

Department Of Electronics & Communication Engineering

A Three-day Workshop

On

"Practical Aspects Of Embedded Systems & IoT"

in association with

PSCMRCET-IEEE Student Forum & Advitiya R & D labs

3rd December to 5th December 2019

Program Coordinator: Mrs. Mahitha B

Resource Persons: 1) Mr. Pavan Attavane, Director
Advitiya R & D Labs, Bangalore.
2) Mr. Abhay S Bhardwaj
Senior Embedded Engineer
Fasal.co, Bangalore.

Target Audience : B.Tech III Year Students & II Year Students

Total no of Participants: 48

Objective of the Workshop:

Train students on modern industrial technology whilst embedding a sense of inquisitiveness towards the same, bridge the gap between academics and industrial applications and instil a level 1 foundation of their respective engineering core.

Outcome of event :

- The participating candidates will have enhanced their engineering capability to design and construct a basic IoT model through sensor integration, transmitting the sensor's data into a Graphical Web server while also working around with the data for project centred specifics. The candidates are thus trained to articulate the hands-on with the means of essential theoretical concepts to make them industry ready.
- By providing Hands-on workshop to students, they will get an idea on hardware components. By using this knowledge, they can develop simple real time projects.
- In this workshop used Embedded C and Python for microcontroller programming

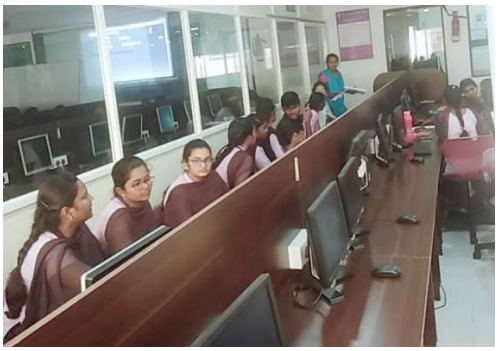
Day 1, 3rd December 2019

Inaugural function started at 10.00 AM. Dr. A Ravi, Professor & HoD, Department Of ECE & convener of the program welcomed all the participants and gave a brief idea about program and basic theme on which all the sessions would be carried out in the duration of program. Hon'ble Principle Dr.K Nageswar Rao and Treasurer K V Rao greeted all the participants and gave their valuable thoughts on importance of such programs. They congratulated and wished all the participants a good time ahead.

Post Inaugural function, session-1 of Day1 was started by **Mr.Abhay, Senior Embedded Engineer,Fasal.co** which was an insight to the basics of IoT

Introduction to Internet of Things (Theory)

- What is IoT and its evolution over time
- Market scenario and prospects
- Definition and Characteristic of IoT



Post lunch of Day1 **Mr.Abhay, Senior Embedded Engineer,Fasal.co & Mr.Pavan ,Director, Advitiya R & D Labs** delivered various concepts of IoT

Overview of IoT Infrastructure (Theory)

- Things in IoT
- IoT Protocols Overview:

- Link Layer (**Ethernet, WiFi, WiMax, LR-WPAN and Mobile communication)**
- Network / Internet Layer **(IPv4, Ipv6 and 6LoWPAN)**
- Transport Layer **(TCP/UDP)**
- Application Layer **(HTTP, CoAP, WebSocket, MQTT, XMPP, DDS, AMQP)**
- Logical Design
- Functional Blocks
- Communication Models

IoT Enabling Technologies:

- Wireless Sensor Networks
- Could Computing
- Big Data Analysis
- Communication Protocols
- Embedded Systems
- IoT Security

Getting started with IoT(Theory & Practical) – Hardware side

- Understanding the WiFi IoT Node.
- Programming the WiFi IoT Node – Arduino C overview, basic programs execution.
- Reading Sensor Data, controlling actuators.
- Connecting to WiFi. Working with web-server.

Day 2, 4th December 2019

Day 2 started with session by **Mr.Pavan** on Hardware aspects of IoT. This session is particularly aimed at covering various protocols, hardware components like sensors & nodes and Real time Interfacing .

The HTTP Protocol (Theory & Practical)

- Overview of the HTTP protocol
- Creating a web server on the WiFi IoT Node.
- Sending Sensor data to the cloud using HTTP protocol.

The MQTT Protocol(Theory & Practical)

- Overview of the MQTT protocol
- SendingWiFi IoT Node sensor data to the cloud and Receiving control data from the cloud
- MQTT client for WiFi Node
- Reading Sensor data and publishing to cloud
- Subscribing to actuator control data from the cloud

Visualizing real-time IoT Data.(Practical)

- Creating Web App to visualize real Time IoT Data
- Creating cross platform mobile App to visualize real Time IoT Data

Inroduction and Basics of Python Programming (Theory &Pracical)

- Basic Python programming
- MQTT implementation

Creating an Intelligent System(Practical)

- Rules, better than hard coded logic.
- Automation and Alerting by Email, Tweet, SMS*.

Case Study Discussion and Conclusion (Theory)

- Case study discussions
- Q & A Session
- Conclusion

Day 3,5th December 2019

On Day 3 **Mr. Abhay & Mr. Pavan** provided guidance for students to identify problem statements and come up with solutions.
Students Interfaced Various Sensors And under their guidance done some simple real time projects and demonstrated them.