PSNA-BLUETRONICS Centre Of Excellence
Industrial Internet of Things (IIoT) Lab
Faculty Training Program for Dept. of EEE

Hands-on Training on Applications of IoT and IIoT with industrial 4.0 standards

Total no of days: 5/6 (8 Hours a day)
Max. no of Participants: 10 (Separate kit will be provided for each participant)
Pre-requisites: Participants should be in relevant to following areas of expertise - Electronics, Microcontrollers & Microprocessors, Digital electronics.

AGENDA:

Day	Content
Day 1 (Morning session) Brush-up session	1. Introduction to Operating systems – Windows, Linux, RTOS, Middleware OS 2. Device drivers, Firmware, BIOS, Bootloader, Filesystem, Kernel, framework, communication protocols.
	Morning Break
	3. Introduction to Ubuntu- Installation, setup, partitioning, packages manager, command line tools, software installation procedures, File permissions 4. Installation of Arduino IDE with addition of libraries, Usage of Microcontroller boards and other hardware, basic operations and usage.
Afternoon Break	
Day 1 (Afternoon session) Basic hands-on	5. I2C, SPI, Hardware interrupt, Wi-Fi Hands-on, Sensors Hands-on. Applications – Load control.
Day 2 (Morning session) Hands-on with sensors	6. Energy measurement, ADC/DAC Hands-on and troubleshooting the problems in Practical designs.
	Morning Break
	7. Datalogging, monitoring, Calibrations, Trigger alerts. 8. Saving data in File. Plotting sensor data.
Afternoon Break	
Day 2 (Afternoon session) Hands-on with Python	9. Introduction to python. 10. Python – Basic Hands-on 11. Creating GUI with python, Data retrieval & Plotting with python, Saving data with python. 12. Python for embedded systems: Hands-on for libraries for sensors and embedded hardware.

Day 3 (Morning session) Hands-on with communication protocols	13. Hands-on with RS232, RS485, Ethernet
	Morning Break
	14. Hands-on with RS232, RS485, Ethernet (Continued) 15. Troubleshooting procedures.
Afternoon Break	
Day 3 (Afternoon session) Hands-on with communication protocols	16. Hands-on with RS232, RS485, Ethernet (Continued) 17. Troubleshooting procedures.
Day 4 (Morning session) Hands-on with IoT	18. Introduction to Connected things, Network elements, Internet of Things (IoT). 19. IoT architecture 20. Nodes, Collector/Aggregator, Gateway, Middleware, Cloud
	Morning Break
	21. Setting up of IoT network. 22. Pushing data to cloud. 23. IoT Protocols – MQTT, CoAP, SQMP. 24. Sample Project 1 (Home Automation & control).
Afternoon Break	
Day 4 (Afternoon session) Hands-on with IoT	25. Sample Project 2 (motor automation & control). 26. Introduction to Single Board Computer (SBC). 27. Setting up an SBC. 28. Setting SBC as IoT Node, SBC as Gateway – Configuration & Deployment. 29. Python, Node.Js and Node red Implementation.
Day 5 (Morning session) Hands-on with IIoT	30. IIoT – Introduction and architecture 31. Difference between IoT & IIoT, Procedures for setting up of IIoT
	Morning Break
	32. Introduction to OPC 33. Hands-on with MODBUS, CANBUS, RS485, SCADA, HMI
Afternoon Break	
Day 5 (Afternoon session) Hands-on with IIoT	34. Real time project 1. 35. Real time project 2.

Pre-Requisites:

1. Non-maskable stable internet for each system.
2. System should have processor speed of 1.4GHz & more and minimum of 4GB RAM.
3. Basic Knowledge about sensors, ADC/DAC, microcontrollers.