

# Electronics & ICT Academy

(Under Ministry of Electronics and Information Technology (MeitY), Govt: of India)

Indian Institute of Technology Guwahati, Guwahati, Assam, Pin 781039

Phone: +91-361-2583182/+91 7086502139

Email: eictacad@gmail.com, eictacad@iitg.ac.in

## Faculty Development Programme on “IoT for Emerging Applications”

**Venue:** Chaitanya Bharathi Institute of Technology (Autonomous), Hyderabad

**Date:** 04 - 08 February, 2020

**Reporting time on 04<sup>th</sup> February is 09:00 am**

Date	Time	Topic	Speakers
04-02-2020 (Day 1)	09:00 am - 09:30 am	Registration/Reporting and Tea	Dr. Ferdous Ahmed Barbhuiya, Associate Professor, Department of CSE, Indian Institute of Information Technology Guwahati
	09:30 am - 10:00 am	Inauguration	
	10:00 am - 01:00 pm	<b>Expert Talk on “Latest Trends and Research Areas in IoT”</b>	
	01:00 pm - 02:00 pm	Lunch Break	
	02:00 pm - 03:00 pm	<b>Introduction to IoT</b> <ul style="list-style-type: none"> <li>• What is IoT?</li> <li>• Basics of IoT</li> <li>• IoT in home automation</li> <li>• IoT Industrial Applications</li> <li>• How large is the IoT Market</li> <li>• Latest updates in the IoT industry.</li> <li>• Available IoT alliances details and the standards that are getting evolved</li> <li>• Multiple IoT applications and solutions available in market</li> <li>• Multiple IoT platform (hardware) example Ras-pi, Arduino,etc., comparison and usage</li> </ul> <b>Introduction to Arduino</b> <ul style="list-style-type: none"> <li>• What is ARDUINO?</li> <li>• What is Open Source Microcontroller Platform?</li> <li>• Arduino GPIO Pins</li> <li>• Basics of Electronics.</li> <li>• Sensors and Actuators.</li> </ul>	Mr. Umang Kejriwal, Finland Lab
	03:00 pm - 04:00 pm	<b>Hands-on with Arduino</b> <ul style="list-style-type: none"> <li>• Fundamentals of C programming</li> <li>• About Arduino IDE (Your First Arduino Sketch)</li> <li>• Digital Output as LED glow</li> <li>• Digital Input Using Switch</li> <li>• Control Output using Digital Input</li> </ul>	
	04:00 pm - 04:15 pm	Tea Break	
	04:15 pm - 05:15 pm	<b>Sensors Interfacing</b> <ul style="list-style-type: none"> <li>• Serial Input and Serial Output</li> <li>• Analog Input and Analog Output</li> <li>• What is Sensor and Actuator</li> <li>• Sensor Feature.</li> <li>• Types of sensors</li> <li>• Interfacing Sensor with Arduino</li> </ul>	

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		<ul style="list-style-type: none"> <li>Reading From Sensors</li> </ul>	
	05:15 pm – 05:30 pm	MCQ – 01 (10 Marks)	
05-02-2020 (Day 2)	09:00 am - 11:00 am	<b>Wifi Module</b> <ul style="list-style-type: none"> <li>Introduction to Esp8266</li> <li>Interfacing of Arduino with ESP8266</li> <li>Introduction to Attention Commands for internet access</li> <li>Connect with WiFi network</li> <li>Access the IP address assigned to ESP8266 and arduino</li> <li>Implementation of IoT</li> </ul>	Mr. Umang Kejriwal, and Mr. Suyog Sawardekar, Finland Lab
	11:00 am - 11:15 am	Tea Break	
	11:15 am - 01:15 am	<ul style="list-style-type: none"> <li>Create a local server using arduino</li> <li>What are cloud Servers</li> <li>Cloud computing and IoT</li> <li>Popular Cloud Servers</li> <li>Cloud platform introduction</li> <li>Creating Channel for live data feed</li> <li>Program arduino to read and update sensor data over cloud</li> </ul>	
	01:15 pm - 02:00 pm	Lunch Break	
	02:00 pm - 03:00 pm	<b>Thingspeak apps</b> <ul style="list-style-type: none"> <li>Connect temperature and humidity sensor</li> <li>Continuously monitor sensor reading through internet</li> <li>Link your Twitter account with Cloud Server</li> <li>Generate API and program arduino</li> <li>How to tweet using Arduino</li> <li>Get sensor data over twitter</li> </ul>	
	03:00 pm - 04:00 pm	<b>Lab Session 1 (10 Marks)</b>	
	04:00 pm – 04:15 pm	Tea Break	
	04:15 pm – 05:15 pm	<b>Creating Twitter App on ThingSpeak</b> <ul style="list-style-type: none"> <li>How to create apps on ThingSpeak?</li> <li>Create a twitter API</li> <li>Trigger an action of twitting through Arduino</li> <li>Make ESP and Arduino to tweet the sensor value</li> </ul>	
	05:15 pm - 05:30 pm	MCQ – 02 (10 Marks)	
06-02-2020 (Day 3)	09:00 am - 11:00 am	<b>Communication Protocol</b> <ul style="list-style-type: none"> <li>What is broker?</li> <li>What are pub and sub?</li> <li>MQTT protocol</li> <li>HTTP vs MQTT</li> </ul>	Mr. Umang Kejriwal, and Mr. Suyog Sawardekar, Finland Lab
	11:00 am - 11:15 am	Tea Break	

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	11:15 am - 01:15pm	<b>Adafruit IO</b> <ul style="list-style-type: none"> <li>• What is Adafruit IO?</li> <li>• How Adafruit IO can be used to control IoT devices</li> <li>• Controlling RGB led through MQTT</li> <li>• Program ESP Module to be controlled through Adafruit IO</li> </ul>	
	01:15 pm - 02:00 pm	Lunch Break	
	02:00 pm - 04:00 pm	<b>Relay control and Home Automation</b> <ul style="list-style-type: none"> <li>• Controlling Relay using Arduino output</li> <li>• Connecting AC devices with arduino via relay</li> </ul> <b>Lab Session 2 (10 Marks)</b>	
	04:00 pm – 04:15 pm	Tea Break	
	04:15 pm – 05:15 pm	<b>Understanding Some more Sensors</b> <ul style="list-style-type: none"> <li>• Ultrasonic Sensor</li> <li>• Mechanism of Ultrasonic Sensor</li> <li>• Program arduino and interface ultrasonic sensor</li> <li>• Measure distance using ultrasonic sensor</li> </ul>	
	05:15 pm - 05:30 pm	MCQ – 03 (10 Marks)	
07-02-2020 (Day 4)	09:00 am - 11:00 am	<b>Update reading and controlling</b> <ul style="list-style-type: none"> <li>• Update ultrasonic sensor reading over cloud</li> <li>• Turn WiFi Module as Station</li> <li>• Connect some devices through WiFi in the given network</li> <li>• Program arduino to receive command as static I.P address</li> <li>• Control devices connected to arduino from address bar of web browser.</li> </ul>	Mr. Umang Kejriwal, and Mr. Suyog Sawardekar, Finland Lab
	11:00 am - 11:15 am	Tea Break	
	11:15 am - 01:15 pm	<b>Amazon AWS</b> <ul style="list-style-type: none"> <li>• How to create account on Amazon Aws and create EC2 Instance</li> <li>• Getting IP address of EC2 Instance</li> <li>• Allocating Elastic IP to instance</li> <li>• Assigning http port to instance</li> </ul>	
	01:15 pm - 02:00 pm	Lunch Break	
	02:00 pm - 04:00 pm	<ul style="list-style-type: none"> <li>• Using Putty and FileZilla</li> <li>• Login to Ubuntu Server Using Putty</li> </ul> <b>Lab Session 3 (10 Marks)</b>	
	04:00 pm – 04:15 pm	Tea Break	
	04:15 pm – 05:15 pm	<ul style="list-style-type: none"> <li>• Installing Ubuntu Server on Aws Ec2 Instance</li> <li>• Installing Apache Server and Php on Ubuntu</li> <li>• Install and Configure MySql on Ubuntu</li> </ul>	



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		<ul style="list-style-type: none"> <li>Installing PhpmyAdmin</li> </ul>	
	05:15 pm - 05:30 pm	MCQ – 04 (10 Marks)	
08-02-2020 (Day 5)	09:00 am - 11:00 am	<b>MySql</b> <ul style="list-style-type: none"> <li>Creating MySql database and tables to store sensor values</li> <li>Creating MySql User authenticated with Password</li> </ul>	Mr. Umang Kejriwal, and Mr. Suyog Sawardekar, Finland Lab
	11:00 am - 11:15 am	Tea Break	
	11:15 am - 01:15 pm	<b>Php</b> <ul style="list-style-type: none"> <li>Introduction to Php and its Basic Syntax</li> <li>Creating API to read sensor data and send to Aws Cloud</li> <li>Creating API to send data to NodeMcu from Cloud</li> </ul>	
	01:15 pm - 02:00 pm	Lunch Break	
	02:00 pm - 04:00 pm	<b>ESP8266 HTTP CLIENT</b> <ul style="list-style-type: none"> <li>Using Http Client to send sensor data to AWS Cloud</li> <li>Using HTTP Client to receive data from AWS Cloud to Node MCU</li> </ul> <b>Doubt Clearing</b>	
	04:00 pm – 04:15 pm	Tea Break	
	04:15 pm - 05:00 pm	Project Development (20 Marks) and MCQ – 05 (10 Marks)	
	05:00 pm - 05:30 pm	Closing Ceremony and Certificate Distribution	