

IoT THROUGH SINGLE BOARD COMPUTER

From 24th Feb till 29 Feb 2020

OVERVIEW:

The curriculum for workshop consists of various modules which includes raspbian setup, arduino programming, wiring pi, icoboard, arm-gcc, wireless iot(esp32, esp8266), I2C, etc.

The main agenda of this workshop is

1. To learn the basic usage of the Arduino and RaspberryPi environment for creating your own embedded projects at low cost.
2. To create IoT applications

Modules:

The course is divided into modules.

Module 1: Raspberry Pi-4 Software Setup

Module 2: Raspberry Pi-4 Gpio

Module 3: Arduino Programming

Module 4: Wireless IOT-Esp32

Module 5: Wiring Pi

Module 6: I2C

Module 7: Icoboard

Module 8: Arm-GCC

Module 9: Gate Orientation

Module 10: Lab Visits

You Should Attend If....

This course is designed for Faculty and Students. For the Students and Faculty from Electrical, Electronics and communication, computer science branch. it is a refresher course. For BTech it will be an advanced course to encourage them check out research avenues.

Fees:

For TEQIP Participants its free of cost.

**Course Co-ordinator****Dr. GVV Sharma**

Dept. of Electrical Engineering,
IIT Hyderabad

Phone No. 9885013891

Email: gadepall@ee.iith.ac.in

Dr. GVV Sharma is an Associate professor in Department of Electrical Engineering at IIT Hyderabad. He has completed Ph.D from IIT Bombay. Currently Heading the **TLC(Teaching and Learning Center)** unit at IIT Hyderabad.

Teaching Assistance:

Ms. Priyanka Rajole - ARM-GCC

Ms. Pratibha Salgar - Icoboard

Ms. Nisha Akole - Gate Orientation

Mr. Durgaprasad - I2C

Mr. Gnana Sai Pavan - Wireless IoT ESP32

Mr. Sridhar Reddy - Wireless IoT ESP32

Mr. Narendra Pulipati - ESP8266

Mr. Gopal Bhattli – Arduino programming.

Schedule:

Registration: 9:00 AM to 9: 20A.M on dated: 24.02.2020

Date		Session-I 9:00 A.M to 11:00 A.M	Session-II 11:15 A.M to 1:15 P.M	Session-III 2:00 P.M to 3:15 P.M	Session-IV 3:30P.M to 5:00 P.M
24.02.2020	Topic	Inauguration	Rpi Software Setup	Rpi Software Setup	Rpi Software Setup
	Expert	-----	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns
25.02.2020	Topic	Rpi GPIO	Rpi GPIO	Arduino Programming	Arduino Programming
	Expert	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns
26.02.2020	Topic	Wireless IOT-ESP32	Wireless IOT-ESP32	Wiring pi	I2C
	Expert	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns
27.02.2020	Topic	Icoboard	Icoboard	Icoboard	Arm GCC
	Expert	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns	Dr GVV +IITH interns
28.02.2020	Topic	Arm Gcc	Gate Orientation	Lab Visits	Valedictory
	Expert	Dr GVV +IITH interns	Dr GVV +Nisha	Dr Gvv	-----

Overview :

Day 1

Session 1: Rpi Software Setup

The session focused on explaining some simple **guidelines** to setting up Raspberry pi software into the system

Session 2: Rpi Software Setup

This session covered the explanation of how to **install** a Raspberry pi OS image into Sdcard.

Session 3: Rpi Software Setup

In this session various **Python packages** such as Numpy, scipy, matplotlib, etc installation from Raspberry archives were explained.

Session 4: Rpi Software Setup

This session focused on introduction to **python programming**.

Day 2

Session 1: Rpi GPIO

This session focused on **introduction** to one of the feature of the raspberry pi i.e GPIO(general-purpose input/output)pins.

Session 2: Rpi GPIO

This session focused on how to **control** GPIO interface on Raspberry pi. Any of the GPIO pins can be designated (in software)as an input or output pin and can be used for wide range of purposes.

Session 3: Arduino Programming

This Session concentrated on teaching the Architecture of Arduino board and the way the pins can be accessed. It also covered explanation of introduction to the applications of Arduino in Digital Design.

Session 4: Arduino Programming

This session focussed on hands on approach for implementation of Digital logic and moves on to Assembly and Embedded C programing through Arduino.

Day 3

Session 1: Wireless IoT-ESP32

This session focused on **Architecture** of ESP32 board, **Programming languages, frameworks, platforms,** and **environments** used for ESP32 programming

Session 2: Wireless IoT-Esp8266

This session focused on **implementing a real time applications** such as controlling a LED, Table fan using Esp32.

Session 3: Wiring pi

This session focused on a **C-library** called Wiring pi that is used to **access** GPIO pins of Raspberry pi and this helps to manage the on-board GPIO interfaces such as bcm235 as well as additional modules like the Gertboard devices, etc

Session 4: I2C

Inter-Integrated Circuit

This session focused on **Introduction and applications** of I2C which is widely used for attaching lower-speed peripheral ICs to processors and microcontrollers in short-distance / intra-board communication.

Day 4***Session 1: Icoboard***

This session focused on *Architecture, Programming languages, frameworks, platforms, and environments* used for Icoboard

Session 2: Icoboard

This session focused on *packages*(Icestorm, Arachne-pnr, yosys) *installation* that are required for Icoboard programming

Session 3: Icoboard

In this session the participants learnt how to control a Led and Seven segment Display

Session 4: Arm GCC- STM32F103C8T6

This session focused on *Architecture, Programming languages, frameworks, platforms, valid packages installation* that are required for Arm-gcc controller(stm32 board).

Day 5***Session 1: Arm-GCC***

This session focused on *application* of Arm-gcc and learnt how to *control LED and SSD* with Arm programming(C) through terminal.

Session 2: Gate Orientation by Mtech Student(Nisha)

The programme is intended to present

- (i) To give an overview of GATE exam
- (ii) To understand benefits of GATE exam to pursue Higher education and to get job in PSUs
- (iii) To analyze subject weightage discipline wise for focus study of students.
- (iv) Preparation tips

Session 3: Lab Visits

Inspection of all the EE & ECE labs was done during the visit.

Session 4: Valedictory Event

Dr. GVV Sharma

Associate Professor, IIT Hyderabad