

COURSE SYLLABUS

**Name of the Group:** *Embedded System Group*

**Name of the Course:** **Certificate Course on Python with Raspberry Pi**

**Course Code:** *ED761*

**Starting Date:** *7<sup>th</sup> january2019*

**Duration:** *2 Weeks*

**Course Structure:** *This course contains total 2 moduleS*

<i>ED761</i>	<i>Module Name</i>	<i>Weeks</i>
<i>ED762</i>	<b>Python Programming</b>	<i>1</i>
<i>ED763</i>	<b>Rpi and IoT</b>	<i>1</i>
	<b>Total</b>	<i>2</i>

a. Course Contents :

## **PY101: PYTHON PROGRAMMING**

**Module Duration: 5 days**

### **Objective**

Objective of the module is to enhance problem solving abilities. Idea is to develop a basic understanding of Python programming language. Students will use their problem solving abilities to implement programs in Python.

### **Course Description**

An Overview of Python, Interpreted languages, Installation, Running Python Scripts, Structure of a Python script, Variables, String types, String operators and expressions, Math operators and expressions, Command line parameters, Flow Control, list operations, Strings are special kinds of lists, Tuples, Sets, Dictionaries, Functions, Working with Files, Errors and Exception Handling, Modules, Packages, Regular Expressions, Python Classes, o-o programming

### **Learning Outcomes**

After successful completion of the module, the students shall be able to:

- Have an intermediate skill level of python programming

### **References:**

- Learning Python, 5th Edition Fifth Edition by Mark Lutz
- Python Cookbook, Third edition 3rd Edition by David Beazley, Brian K. Jones
- Python Crash Course: A Hands-On, Project-Based Introduction to Programming 1st Edition by Eric Matthes

## **PY102: *Rpi and IoT***

**Module Duration: 5 days**

### **Objective**

Raspberry Pi is the latest low-cost computing platform that enables to create interesting applications with basic programming languages. This course is to train the participants to startup with Raspberry Pi board and develop applications. IoT fundamentals will be discussed in the module. Participants will use their Python Programming skills to develop IoT applications on Rpi platform.

## Course Description

Introduction to RPi, Interacting and configuring the RPi OS, Booting RPi ,Networking the RPi ,Hardware interfaces, GPIO and interfacing peripherals, Sensor Interfacing, IoT, Programming the Raspberry Pi for IOT, Networking fundamentals for IoT, Cloud basics MQTT, IoT applications

## Learning Outcomes

After successful completion of the module, the students shall be able to:

- Write Python programs for the Raspberry Pi
- Sensors and actuators interfacing
- Create MQTT-based remote monitoring and control applications
- Develop practical IoT applications with Raspberry Pi

## Reading List

- Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr. Ovidiu Vermesan, Dr. Peter Friess, River Publishers
- Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition
- Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
- Programming the Raspberry Pi, Second Edition: Getting Started with Python by Simon Monk