ECE664:RASPBERRY PI

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: identify the various capabilities of Raspberry Pi

CO2 :: interpret the given logic into Python code to solve the real world problems

CO3 :: use the different input/output devices for creating real world applications

CO4 :: analyze the various communication protocols supported by Raspberry Pi

CO5 :: test the usage of cloud server and its programming

CO6 :: design IOT based devices using Raspberry Pi

Unit I

Getting started with Raspberry Pi : introduction to raspberry pi, pin description of raspberry pi, comparison of various raspberry pi models, on-board components of raspberry pi

Setting up the Pi : downloading the image, setting up of OS, updating Pi OS

Unit II

Introduction to Python programming : basic syntax, variable and data types, operators, control structures, functions in python programming

Unit III

GPIO Handling of Raspberry Pi : pin configuration of raspberry pi, popular Linux commands used for raspberry pi, interfacing of LED with raspberry pi

Programming Raspberry Pi for PWM : servo motor control, controlling the brightness of LED

Unit IV

Display devices interfacing with Raspberry Pi : 16x2 I2C LCD, organic light-emitting diode (OLED) display, seven segment display (SSD)

Unit V

Serial Bus Programming of Raspberry Pi : UART, SPI, I2C

Sensors and actuators interfacing with Raspberry Pi : ultrasonic sensor, IR sensor, analog sensors, DHT11/DHT22, DC motor

Unit VI

Controlling GPIO with IOT : controlling gpio of raspberry pi using free cloud services, connect raspberry pi to cloud, send sensor data to cloud

List of Practicals / Experiments:

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- servo motor interfacing with raspberry pi
- programming raspberry pi for thing speak IoT server
- programming raspberry pi for ultrasonic sensor
- programming raspberry pi for LED and push button interfacing
- interfacing DHT11/DHT22 with raspberry pi
- interfacing IR/PIR senor with raspberry pi
- DC motor interfacing for speed and direction control
- controlling the brightness of LED
- interfacing I2C LCD with raspberry pi
- seven segment display (SSD) interfacing with raspberry pi

Text Books:

1. RASPBERRY PI COOKBOOK: SOFTWARE AND HARDWARE PROBLEMS AND SOLUTIONS by SIMON MONK, O'REILLY