

ECE284:RASPBERRY PI FOR THE BEGINNERS

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

Course Outcomes: Through this course students should be able to

- CO1 :: recognize the various capabilities of Raspberry Pi
- CO2 :: transform the given logic into Python code and apply to design the problems using Raspberry Pi
- CO3 :: recognize the various capabilities of Raspberry Pi and design the problems based on that
- CO4 :: demonstrate the usage of Thingspeak IoT server and its programming with Raspberry Pi
- CO5 :: focus on Python programming for controlling Raspberry Pi
- CO6 :: understand how R-pi can be leveraged as an IoT gateway

Unit I

Getting started with Raspberry Pi : general definitions of microcomputers, microprocessor v/s microcontrollers, introduction to raspberry pi, comparison of various R-Pi models, pin description of raspberry pi, on-board components of R-Pi

Unit II

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

GPIO handling of Raspberry Pi : introduction to header files, pin configuration of raspberry pi, popular linux commands used for R-Pi, interfacing of LED with raspberry pi

Unit III

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

Output devices with Raspberry Pi : LCD interfacing with raspberry pi, seven segment interfacing with raspberry pi, Interfacing DC motor with raspberry pi

Unit IV

Design of traffic light system : design a n bit up and down counter using LED's, design a programmable traffic light system

Unit V

Finding Object with Raspberry Pi : ultrasonic sensor interfacing with raspberry pi, IR sensor interfacing with raspberry pi, PIR Sensor interfacing with raspberry pi

Unit VI

Serial Bus Programming of Raspberry Pi : UART, SPI, I2C, IoT and blockchain

Controlling Arduino with Raspberry Pi : installing pyfirmata and controlling arduino gpio with pyfirmata, blinking LED with python script

Controlling GPIO with IoT : controlling GPIO of raspberry pi using free cloud services

List of Practicals / Experiments:

List of Practicals

- programming raspberry pi for LED interfacing
- controlling brightness of LED
- seven segment interfacing with raspberry pi
- interfacing LCD with raspberry pi
- servo motor interfacing with raspberry pi
- DC motor interfacing with raspberry pi
- programming raspberry pi for ultrasonic sensor
- interfacing IR sensor with raspberry pi
- interfacing DHT11 with raspberry pi

- programming raspberry pi for thing speak IoT server

Text Books:

1. GETTING STARTED WITH RASPBERRY PI, 3RD EDITION by SHAWN WALLACE, MATT RICHARDSON, O'REILLY

References:

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