CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

ECE Department

Value added courses

20ECV04

Course Title: Raspberry Pi and its peripherals

Instructions	30L Hours per Week

Overview of IoT: Understanding IoT fundamentals, IOT Architecture, protocols, Various Platforms for IoT, Real time Examples of IoT, Overview of IoT components and IoT Communication Technologies, Getting started with Raspberry Pi,

Overview of Raspberry Pi: Introduction to Raspberry Pi, Comparison of various Rpi Models, Understanding SoC architecture and SoCs used in Raspberry Pi, Pin Description of Raspberry Pi , On-board components of Rpi.

Booting up RPi- operating System and Linux Commands, Linux- Introduction, Architecture, File System, Raspbian Operating System - Introduction, Tools like Leaf pad Editor, Installing Raspbian on Pi, First boot and Basic Configuration of Pi, Popular Linux Commands.

RPi using Python and Sensing Data using Python: Introduction, Python vs. Other Languages, Applications of Python.

Understanding Python Interpreted Languages: Variables, Keywords, Operators and Operands, Data Types in Python, Importing Libraries, Flow Control, Conditional Statement, Loops.

Sensors Interfacing: Temperature and Humidity Sensor DHT11), Motion Sensor PIR), Obstacle detection using Ultrasonic sensor, etc. • Communicating using RPi- GSM interfacing, Accessing on-board Wi-Fi, Connecting Database with RPi

RPi with C Language: C Basics- compiled language, C Concepts- data types, variables, conditional statement, loops, Library installation, Compiling C programs, Using Wiring Pi for GPIO Programming, Interfacing Rpi using C

IoT Design using Raspberry Pi • IoT Applications based on Pi, LAMP Web-server, GPIO Control over WebBrowser, Creating Custom Web Page for LAMP, Communicating data using on-board module, Home automation using Pi, Node-RED, MQTT Protocol, Using Node-RED Visual Editor on Rpi

Texts/ References:

1. Programming the Raspberry Pi, Second Edition: Getting Started with Python 2nd Edition by Simon Monk McGraw Hill Professional, 04-Jun-2021 - Technology & Engineering - 208 pages
2. Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux 1st Edition by Derek Molloy, wiley publications 2016.

3. The Computer Programming Bible: A Step by Step Guide On How To Master From The Basics to Advanced of Python, C, C++, C#, HTML Coding Raspberry Pi3 by C.P.A Inc 2020.
4. Raspberry Pi IoT Projects: Prototyping Experiments for Makersby John C. Shovic, APress 2016