

IOT Using Raspberry Pie & Python Programming – 2 Months

Eligibility – B.E, B.Tech, M.E, M.Tech.

Modules

- C Programming
- Data Structures
- Linux Commands, Shell Scripting
- Python Programming
- Internet of Things
 - Edge Node Design & Development
 - Advanced- Raspberry Pi as Gateway
 - Security- Encryption, Secure Communication

Platform:

- Ubuntu (Linux OS, with gcc compiler)
- Lpc 2129, Lpc1768 ,KeilMicrovision
- Raspberry Pi 3

Project Stream:

- Application development based on Data Structure (eg: Flood fund releasing data, cyber management systems, Bank management system, contact management system).
- Embedded Project development using wired/wireless technology such as GPS, GSM, BLE, Wi-Fi and sensors.
- Real-time project development on Automation using IoT.
- Facial/image Recognition system using Raspberry-pi.

Modules

Section – 1 Recordings

Programming in C and Data Structures – 12 hrs

Introduction to C	Data types	operators
Control Flow	Modular Programming	Preprocessor
Storage classes	Arrays & Strings - Character Arrays	Advanced C Programming: Pointers
Advanced Pointers : NULL pointer, Pointer to a constant , constant pointer	Dynamic memory allocation	Recursion
Command line arguments	Files I/O, Block I/O	Random Access - fseek ,ftell , rewind
Data structures Introduction	Stack and Queues	Linked list introduction
Types of linked list	Trees Introduction	BST and Expressions

Linux Commands, Shell Scripting – 2 Hrs

File & Directory Commands - ls, mkdir, cd, pwd, rm,cat	Process Related Commands - Ps, fg, bg, jobs	Text Manipulation Commands - Head, tail, cut, paste, sort, diff, comm
Shell Scripting	Conditions: if, switch, expr, test	Loops: while, for

Section – 2 Live Online Sessions

Python

Introduction to Python	Python Data types and Conditions	Control Statements
Defining Functions	List and Tuple	List Comprehension
Set and Dictionary	File Handling & Exception Handling	Object Oriented Programming

Internet of Things

Raspberry Pi as Gateway

Introduction to Hardware Platform	Interfacing peripherals.	Configuring Serial Communication
Raspberry Pi3 Evaluation board architecture, Building and setting up RASPBIAN on the kit.	Raspberry Pi3 GPIO programming.	Wireless communication between Edge node and gateway using Zigbee.
Updating and upgrading RASPBIAN. Installing required packages	BCM Mode & Board mode. Interfacing LCD module. Interfacing sensors & actuators	Interfacing DHT11 to Rpi. Installing Adafruit python package
Designing RPi as Web Server	Connecting to Cloud	IOT Automation
Server configuration. Setting up RPi 3 as Web Server for Mail Transfer using SMTP	REST and MQTT communication protocols.	IoT applications for Smart Gateway: smart home/smart car/smart grid