

ECE237:ARCHITECTING SMART IOT DEVICES

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

Course Outcomes: Through this course students should be able to

- CO1 :: discuss the basic elements of NodeMCU development board
- CO2 :: perform the programming of Input, Output devices and PWM control with NodeMCU
- CO3 :: apply the C programming to I2C and SPI serial bus of NodeMCU
- CO4 :: utilize NodeMCU for programming Bluetooth for wireless data transfer
- CO5 :: demonstrate the usage of Thingspeak IoT server and its programming with NodeMCU
- CO6 :: construct smart devices with Blynk and Thingspeak applications

Unit I

Getting started with NodeMCU : NodeMCU Board and supported peripherals, setting up nodemcu, serial port programming, configuring general purpose input output pins as output, configuring general purpose input output pins as input, Comparison of ESP8266 and ESP32

Unit II

Input devices with NodeMCU : Programming NodeMCU for DHT11, Programming NodeMCU for Ultrasonic sensor, programming temperature sensor, programming ir sensor, Compare DHT11 and DHT22, programming LDR sensor

Unit III

Output devices with NodeMCU : LCD interfacing with NodeMCU, Seven segment interfacing with NodeMCU, Interfacing DC motor with NodeMCU

Unit IV

Programming NodeMCU for PWM : controlling the brightness of led, servo motor control using pwm, dc motor control using pwm

Unit V

Bluetooth with NodeMCU : data transfer through Bluetooth interface, voice controlled Bluetooth device

Programming I2C and SPI devices : liquid crystal display with I2C, protocol of SPI, protocol of I2C

Unit VI

IoT with Thingspeak : Introduction to Thingspeak IoT server, Programming NodeMCU for Thingspeak IoT server

IoT with Blynk : Introduction to Blynk IoT application, Creating smart device with Blynk application

Futuristic Technologies : edge computing, autonomous systems, robotics and automation, energy efficient designs, internet of things in agriculture, internet of things in healthcare

List of Practicals / Experiments:

List of practical's

- Programming NodeMCU for data transfer through Bluetooth
- creating smart device with blynk application
- Interfacing of NodeMCU with LED to form traffic lights
- Interfacing of NodeMCU with 7 seg display to display Univ regd number
- Interfacing of NodeMCU with I2C- LCD , and display Name and univ regd number
- Interfacing of NodeMCU with Motors for direction & speed control
- Interfacing of NodeMCU with DH11/DH22 and display the results on LCD/ Serial Monitor.
- Interfacing of NodeMCU with Ultrasonic sensor for distance measurement using Serial monitor/ LCD interface
- Interfacing of NodeMCU to control the brightness of LED using potentiometer sensor

- Creating Smart device using Thingspeak IoT server

Text Books: 1. PROGRAMMING NODEMCU USING ARDUINO IDE by UPSKILL LEARNING, PAPERBACK

References: 1. NODEMCU DEVELOPMENT WORKSHOP by AGUS KURNIAWAN, KINDLE EDITION