



BHAVAN'S VIVEKANANDA COLLEGE

of Science, Humanities and Commerce, Sainikpuri
Autonomous College | Affiliated to Osmania University
Accredited with 'A' Grade by NAAC
Syllabus - B Sc III Year Electronics

(To be implemented for the students joined in 2020-21)
wef the academic year: 2022 - 23

Semester V – (GE) Introduction to IoT with Arduino (60 Hours) – Paper Code: GE 524 A

Course Objective: The objective of this course is to

COB1: study fundamental concepts of IoT using a low-cost device Arduino.

COB2: Includes insights of Arduino, basic programming, types of sensors and actuator.s

COB3: Learn different protocols used for IoT design.

COB4: Acquire ability to make industrial, engineering and home automation related projects.

UNIT- I

(15)

Introduction to IoT: The impact of IoT in industry and daily life, Understanding the IoT ecosystem: devices, platforms, and applications. Overview of IoT Components - Analog sensors, Digital Sensors: Eg. Ultrasonic Sensor, PIR Motion Sensor, Moisture Sensor, Temperature Sensor, Touch Sensor, Infrared Sensor, Servo Motor.

UNIT- II

(15)

Basics of Networking: Communication Protocols

Overview of IoT Communication - Wi-Fi, Bluetooth, RFID, I2C and SPI

Wireless Sensor Networks: History and Context, the node, Connecting nodes, Networking Nodes, WSN and IoT.

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus.

IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols

UNIT- III

(15)

Types of Arduino devices, Introduction to Arduino Uno and Nano. Understanding Arduino UNO Board and Components Installing and working with Arduino development environment (Arduino IDE), Programming Arduino devices, exploring the Arduino language (C/C++) syntax, Coding, compiling, and uploading to the microcontroller.

Prasanna
29/05/2022

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Integration of Sensors and Actuators with Arduino, perform experiments using Arduino Uno to Learn, interfacing of sensors and actuators: temperature, pressure, humidity, luminous, soil moisture, relays and motors, LCD, LED.

Unit- IV

(15)

Working with Arduino Communication Modules: Bluetooth Modules, WiFi Modules, RFID Modules. Introduction to Nano 33 IoT, nodemcu ESP8266, Architecture of nodemcu and GPIO pins, establishing WiFi Connection with nodemcu.

Implementation of Cloud, interface cloud with IoT Devices, LED Blinking, and Implementation of Project based on IoT - creating an IoT Temperature and Humidity Sensor System with DHT-22 Sensor Using a Mobile App to Control Arduino IoT.

Applications: Home automation, Industrial automation, Smart lighting, Smart agriculture.

Course outcomes:

On completion of the course, student will be able to

CO1: understand various concepts, terminologies and architecture of IoT systems.

CO2: use sensors and actuators for design of IoT.

CO3: understand and apply various protocols for design of IoT systems.

CO4: understand various applications of IoT and implement as Do it yourself projects.


Recommended Books:

1. Embedded/ Real-Time Systems: Concepts, Design & Programming, Black Book by K. V. K Prasad, Dreamtech Press, 1st Edition, 2003.
2. Internet of Things (A Hands-on-Approach) by Arshdeep Bahga, Vijay Madisetti, VPI publisher, (1st edition), 2016.
3. *Introduction to IoT* by S. Misra, A. Mukherjee, and A. Roy, Cambridge University Press. 2020.

Reference Books:

1. ARM System-on-Chip Architecture by Steve Furber, Pearson Education, 2016.
2. Sensors and Transducers by D Patranbis, P. H. India, Pvt. Ltd, (2nd edition), 2003.
3. The Internet of Things: Enabling Technologies, Platforms, and Use Cases" by Pethuru Raj and Anupama C. Raman, CRC Press.
4. Introduction to Industrial Internet of Things and Industry 4.0. by S. Misra, C. Roy, and A. Mukherjee, CRC Press. 2020.

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22/05/2022


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