BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(An Autonomous Institution)
Amalapuram–533201,Dr. B.R.Ambedkar Konaseema DT,Andhra Pradesh.
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Accredited by NBA)

III Year II Semester Course Code: 23SC6L02	IOT APPLICATIONS OF ELECTRICAL ENGINEERING LAB (SKILL ENHANCEMENT COURSE)	L	T	P	C
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Pre-requisite: Concepts of Computer Organization, Computer Networks.

Course Objectives:
- To understand the working of Arduino.
- To learn the programming of Raspberry PI.
- To know various sensors with Arduino/Raspberry Pi.
- To interface various displays with Arduino/Raspberry Pi.
- To connect with various wireless communication devices

Course Outcomes:
At the end of the course - students will be able to:

CO1:Operate the Arduino Integrated Development Environment with embedded c. CO2: Program the embedded Python in Raspberry Pi OS.

CO3: Interface various sensors with Arduino/Raspberry Pi in the IoT environment.

CO4:Connect different displays with Arduino/Raspberry Pi

C05:Interconnect with wireless communication technologies.

Topics to be covered in Tutorials

Module–1: Programming Arduino: (3 hrs)
Arduino - Classification of Arduino Boards - Pin diagrams – Arduino Integrated Development Environment (IDE) – Programming Arduino.

Module–2: Sensors: (5 hrs)
Working of temperature sensor, proximity sensor, IR sensor, Light sensor, ultrasonic sensor, PIR Sensor, Colour sensor, Soil Sensor, Heart Beat Sensor, Fire Alarms etc. Actuators: Stepper Motor, Servo Motor and their integration with Arduino/Raspberry Pi.

Module–3: Raspberry Pi: (2 hrs)
Introduction, Classification of Rasperberry Pi Series - Pin diagrams – Programming Rasperberry Pi.

Module–4: Display: (2 hrs)
Working of LEDs, LED, OLED display, LCDs, Seven Segment Display, Touch Screen etc. Analog Input and Digital Output Converter etc. and their integration with Arduino/Raspberry Pi.

Module–5: Wireless Communication Devices: (4 hrs)
Working of Bluetooth, Wi-Fi, Radio Frequency Identification (RFID), GPRS/GSM Technology, ZigBee, etc and their integration with Arduino/Raspberry Pi. Features of Alexa.

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List of experiments

Any 10 of the following experiments are to be conducted:

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation.
2. Interfacing of LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.
3. Interfacing of Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. Interfacing of temperature sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.
5. Interfacing of Organic Light Emitting Diode (OLED) with Arduino/Raspberry Pi
6. Interfacing of Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.
7. Interfacing of Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '1'/'0' is received from smartphone using Bluetooth.
8. Write a program on Arduino/Raspberry Pi to upload and retrieve temperature and humidity data to thingspeak cloud.
9. Interfacing of 7 Segment Display with Arduino/Raspberry Pi
10. Interfacing of Joystick with Arduino/Raspberry Pi
11. Interfacing of Analog Input & Digital Output with Arduino/Raspberry Pi
12. Night Light Controlled & Monitoring System
13. Interfacing of Fire Alarm Using Arduino/Raspberry Pi
14. IR Remote Control for Home Appliances
15. A Heart Rate Monitoring System
16. Alexa based Home Automation System