Techno College of Engineering Agartala

An Engineering College Approved by AICTE, MHRD, Govt. of India
Affiliated to Tripura University (A Central University),
Department of Computer Science and Engineering

List of Laboratory Experiments

IoT and Embedded Computing Lab						
Course Code	**Hours / Week**				**Maximum Marks**	
PC CS 513	L	T	P	C	CIA	SEE	Total
	0	0	2	1	40	60	100

Number of classes: 24 Hours	**Prerequisites: Nil**
Branch: CSE(AIDS)	**Semester: V**

Course overview:

This course offers an integrated introduction to Embedded Systems and the Internet of Things (IoT), with a strong focus on practical applications using popular hardware platforms like Arduino and Raspberry Pi. Students will develop an understanding of embedded systems concepts, real-time operating systems (RTOS), and IoT fundamentals including sensing, actuation, networking, communication protocols, and sensor networks. The course emphasizes hands-on experience through interfacing sensors, actuators, communication modules, and cloud platforms for IoT data management. Learners will gain technical proficiency in programming and deploying embedded IoT solutions, enabling them to design and implement smart applications in diverse domains.

Course objectives:

i. Understand the fundamentals of embedded systems and real-time operating systems (RTOS), recognizing their role and operation in modern applications.

ii. Explain the core concepts of IoT, including sensing, actuation, networking, communication protocols, and sensor networks.

iii. Summarize various real-life applications of IoT across different sectors, understanding its impact and potential.

iv. Develop practical skills to experiment with Arduino and Raspberry Pi platforms, coding and interfacing sensors, actuators, communication modules, and cloud data services for IoT implementation.

Course outcomes:

CO Number	CO Description	K-level
CO-1	Understand the concept of Embedded systems and RTOS	K-2
CO-2	Explain the Basic idea of IoT, Sensing, Actuation, Networking, Communication Protocols, and Sensor Networks	K-2
CO-3	Summarize the real-life applications of IoT in various fields	K-2
CO-4	Experiment with arduino, raspberry pi coding for IoT implementation	K-3
Sl. No.	**EXPERIMENT NAME**	**CO**
1.	Familiarization with Adruino/Raspberry Pi and perform necessary software installation	CO-1
2.	To interface LED buzzer with Arduino/Raspberry Pi and write a program to turn on LED for 1 second after every 2 seconds	CO-4
3.	To interface push button Digital sensor (IR/LDR) Arduino/Raspberry Pi and write a program to turn on LED when push button is pressed or a sensor detection	CO-4

4.	To interface DHT 11 sensor with Arduino Raspberry Pi and write a program to print temperature and humidity readings	CO-4
5.	To interface monitor using relay with Arduino/Raspberry pi and write a program to turn on motor when push button is pressed	CO-4
6.	To interface OLTD with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it	CO-4
7.	To interface Bluetooth with Arduino/Raspberry pi and write a program to send sensor data to smart phone using Bluetooth	CO-4
8.	To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn on LED ON/OFF when '1'/'0' is received from smart phone using Bluetooth	CO-4
9.	Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to Things peak cloud	CO-3
10.	Write a program on Arduino/Raspberry pi 2 retrieve temperature and humidity data from Thing speak cloud. To install MySQL database on Raspberry Pi and perform basic SQL queries	CO-2
11.	Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT blocker	CO-4