COURSE CONTENT

COMPUTING THINGS LABORATORY								
VII Semester: CSE | IT								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ACSD54	**Core**	0	0	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Nil								

I. COURSE OVERVIEW:

The Internet of Things (IoT) Laboratory course provides hands-on experience in designing, developing, and implementing IoT-based solutions. It aims to equip students with the skills needed to understand and utilize IoT technologies in real-world applications. By engaging with various IoT hardware, software, and platforms, students will learn to build systems that connect physical devices to the digital world..

II. COURSE OBJECTIVES:

The students will try to learn:

I	IoT architecture, communication models, and standard protocols using open-source tools.
II	How to integrate sensors, actuators, and microcontrollers to collect and process data using Python-based applications.
III	A complete IoT solution to address real-world problems.
IV	The communication protocols such as MQTT and HTTP and utilize open-source cloud platforms for IoT applications.

III. COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO1	Develop and deploy IoT systems involving sensors, actuators, and controllers using Python.
CO2	Select and apply appropriate communication protocols and platforms for IoT applications.
CO3	Implement data collection, processing, and visualization techniques using open-source tools.
CO4	Design IoT solutions that emphasize efficiency, scalability, and security.
CO5	Create innovative IoT-based projects addressing contemporary challenges in domains such as smart homes, healthcare, and industrial automation.

IV. COURSE CONTENT:

Week – 1: Introduction to Sensors Data
Reading sensor data using Python.

Week – 2: Analysis and Monitoring
Light intensity monitoring using Python.

Week – 3: Display the Temperature and Humidity of Soil
Soil moisture monitoring and automation using Python

Week – 4: Analysis and Display the Temperature and Humidity of Weather data
Temperature and humidity sensing using Python.

Week – 5: Sensor station data Analsysis
Displaying sensor data using Python scripts

Week – 6: Controlling LED
LED control using Python-based programs

Week – 7: Servo motor control
Servo motor control using Python

Week – 8: Interfacing Bluetooth with Arduino
Bluetooth-based device control using Python

Week – 9: Communication using Python Programming
Device-to-device communication using Python

Week – 10: RGB LED control using Python
RGB LED control using Python PWM.

Week – 11: Data Logging
Data logging using Python

Week – 12: Data visualization
Data visualization using Python

Week – 13: Distance Measurement
Ultrasonic distance measurement using Python

Week – 14: Project Report

Mini Project: Smart Computing Application using Python

V. TEXTBOOKS:

1. Arshdeep Bahga and Vijay Madisetti, *Internet of Things: A Hands-On Approach*, Universities Press.
2. Raj Kamal, *Internet of Things: Architecture and Design Principles*, McGraw-Hill Education.

VI. REFERENCE BOOKS:

1. Olivier Hersent, David Boswarthick, and Omar Elloumi, *The Internet of Things: Key Applications and Protocols*, Wiley

VII. ELECTRONICS RESOURCES:

1. http://www.iare.ac.in

VIII. MATERIAL ONLINE:

1. Course template
2. Lab manual