



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

## COURSE CONTENT

EDGE ANALYTICS LAB								
II Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
2225836	Foundation	0	0	4	2	40	60	100
		Practical Classes: 60			Total Classes:60			
Contact Classes: Nil	Tutorial Classes: Nil							
<b>Prerequisites:</b> Basic understanding of computer systems, hardware, software, and operating environments.								

### Course Overview:

This course introduces the concepts, architectures, and techniques used in Edge Analytics, where data processing and analysis are performed closer to the data source instead of centralized cloud systems. The course covers real-time data processing, Internet of Things (IoT), distributed computing, machine learning at the edge, and low-latency analytics.

### Course Objectives:

1. Understand the concept of edge computing
2. Understand the Edge computing Architecture
3. Implement the edge computing in IOT
4. Understand the concept of multi-access edge computing
5. Implement edge computing in MEC

### Course Outcomes:

1. Understand and configure edge computing environments using IoT devices such as ESP8266 and Raspberry Pi.
2. Develop and deploy microservices using Edge Computing tools such as ioFog and Azure IoT Edge.
3. Implement edge-to-cloud communication using standard IoT protocols such as HTTP and MQTT.
4. Design and execute real-time IoT Edge applications for data acquisition, logging, and control.
5. Integrate and manage IoT devices and Edge modules using cloud platforms

### List of Experiments:

1. Set up the Arduino IDE for ESP8266-12 module and program it to blink a LED light.
2. Installation tools to create and manage ECN's
3. Deploy micro services and writing your own microservices
4. Setup the Communication Parameters
5. Implement any two Communications protocols
6. Deploy modules to a Windows IoT Edge device
7. Create an IoT hub.
8. Register an IoT Edge device to your IoT hub.
9. Install and start the IoT Edge for Linux on Windows runtime on your device.
10. Remotely deploy a module to an IoT Edge device and send telemetry.
11. Python based basic programs using Raspberry Pi.
12. Deploy a module Manage your Azure IoT Edge device from the cloud to deploy a module that sends telemetry data to IoT Hub.

13. Publishing Data using HTTP.
14. Sensor Interfacing and Logging using MQTT.
15. File IO Example - # Example code to demonstrate writing and reading data to/from files
16. write code to turn on one of the LEDs on the board (Breadboard)

#### TEXT BOOKS:

1. Hands-On Edge Analytics with Azure IoT: Design and develop IoT applications with edge analytical solutions including Azure IoT Edge by Colin Dow
2. MicroPython for the Internet of Things A Beginner's Guide to Programming with Python on Microcontroller, Charles Bell, A Press.

#### REFERENCE BOOKS:

1. Learn Edge Analytics - Fundamentals of Edge Analytics: Automated analytics at source using Microsoft Azure by Ashish Mahajan
2. Peter Waher, "Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3", First Edition, Packt Publishing, 2018
3. John C. Shovic, "Raspberry Pi IoT Projects: Prototyping Experiments for Makers", Packt Publishing, 2016
4. Python for Microcontrollers: Getting Started with MicroPython Paperback – 16 December 2016, by Donald Norris, McGraw-Hill Education TAB
5. Programming with MicroPython: Embedded Programming with Microcontrollers and Python, by Nicholas H. Tollervey, O'Reilly
6. R. Buyya, S.N. Srirama (2019), Fog and Edge Computing: Principles and Paradigms, Wiley-Blackwell, 2019.

#### ELECTRONIC RESOURCES:

1. <https://docs.aws.amazon.com/>
2. <https://learn.microsoft.com/azure>
3. <https://cloud.google.com/docs>
4. <https://www.coursera.org/>
5. <https://www.udemy.com/>

#### MATERIALS ONLINE:

1. Course template
2. Open-ended experiments
3. Definitions and terminology
4. Lab Manual