IoT Syllabus

Each lecture = 2 hours (1 hour theory + 1 hour practical/case study)

Unit 1: Embedded System Design (ESD)

- 1 : Intro to sensors (analog), neuroscience (Upside Down Labs), actuators (digital)

  : InMoov Humanoid robot case study, Boston Dynamics

- 2 : Microcontrollers (Arduino + ESP32) vs Microprocessors

  : Intro to simulators – Wokwi, Tinkercad – connecting ESD

- 3 : Arduino, Raspberry Pi pinout – Embedded C

  : Arduino LED blink, Traffic system, LED with button

- 4 : ESP32 pinout – MicroPython

  : ESP32 LED blink, Traffic system

- 5 Raspberry Pi and Jetson Nano study

  : Pi Pico LED blink + can do anything in it

Unit 2: Introduction to IoT

- 1: Intro + Applications + Architecture

  : Case Study – Leopard Detection Problem Statement

- 2: Sensory networks, nodes

  : Smart Agriculture – Case Study

Unit 3: IoT Networking and Communication

- 1. Network Basics

  : Ultrasonic Project – Smart Alert System with LED (MicroPython)

- 2. Types of networks

  : Task – How would you utilize networks? Come up with a project idea (Ultrasonic Smart Alert System with Buzzer using WiFi and Bluetooth)

- 3. Communication Protocols

  : LCD project using MicroPython

Unit 4: Industry 4.0 & Smart Systems

- 1. : What is Industry 4.0, use cases

  : Ultrasonic sensor with motor (MicroPython)

- 2. : IIoT, Big Data, Cyber-Physical Systems

  : PIR with lights + buzzer / Gas sensor with lights

- 3. : Data Science in IoT, TinyML notebook

  : Gas sensor with buzzer

Unit 5: Future Tech, Challenges & Sustainability

- 1. : Hyperautomation, Challenges

  : Password lock project

- 2. : Ethics, Green and Sustainable Technology