IoT + Machine Learning Internship Curriculum (6 Months + Major Project)

Month 1: Programming & IoT Foundations

Week 1–2: Python & Embedded Basics

- Python Basics for IoT

- Data Types, Control Structures

- Working with Sensors Data

- Intro to Embedded Systems

Week 3–4: IoT Fundamentals

- What is IoT & Use Cases

- IoT Architecture

- Sensors & Actuators

- Microcontrollers (Arduino / ESP32)

- Communication Protocols (I2C, SPI, UART)

Mini Task: Sensor Data Reading Project

Month 2: Hardware & Networking

Week 5–6: Microcontrollers & Hardware

- Arduino / ESP32 Programming

- GPIO, Sensors Integration

- Actuators (LED, Relay, Motors)

Week 7–8: IoT Networking

- Wi-Fi, Bluetooth, LoRa Basics

- MQTT Protocol

- HTTP/REST APIs

- Cloud Connectivity

Mini Project: IoT Device Data to Cloud

Month 3: Data Collection & Analysis

Week 9–10: Data Handling

- Data Logging from IoT Devices

- Python for Data Processing

- Data Cleaning & Visualization

Week 11–12: ML Foundations

- Introduction to Machine Learning

- Regression & Classification

- Train/Test Split

- Model Evaluation

Mini Project: Sensor Data Analysis & Prediction

Month 4: Machine Learning for IoT

Week 13–14: ML Models for IoT

- Time Series Analysis

- Anomaly Detection

- Predictive Maintenance Models

Week 15–16: Edge ML

- ML on Edge Devices

- TensorFlow Lite Basics

- Model Optimization

Mini Project: Edge ML Prediction System

Month 5: Cloud, Automation & Security

Week 17–18: IoT Cloud Platforms

- AWS IoT / Azure IoT Basics

- Data Storage & Dashboards

- Alerts & Automation

Week 19–20: IoT Security

- IoT Threats & Attacks

- Device Authentication

- Secure Communication

- Firmware Updates

Mini Project: Secure IoT Monitoring System

Month 6: Major Project & Career Skills

Week 21–22: Major Project Development

Major Project Options:

- Smart Home Automation with ML

- Smart Agriculture Monitoring System

- Predictive Maintenance System

- Smart Energy Monitoring

- Industrial IoT Analytics Platform

Features:

- Sensor Integration

- Real-time Data Collection

- ML-based Prediction

- Cloud Dashboard

Week 23–24: Career Preparation

- Git & GitHub

- Resume & Portfolio Building

- Interview Preparation

- Mock Interviews

- IoT + ML Career Guidance

Tools & Technologies

- Python

- Arduino / ESP32

- Sensors & Actuators

- MQTT, REST APIs

- Scikit-learn

- TensorFlow Lite

- AWS / Azure IoT

Internship Deliverables

- Weekly Lab Tasks

- Mini Projects

- Major Project (Live)

- Internship Certificate

- Project Documentation

Final Outcome

- Strong IoT & ML Fundamentals

- Hands-on Hardware + Software Skills

- Real-time Industry Projects

- Job-ready IoT + ML Profile