internStudio

IOT INTERNSHIP

TASK GUIDE

Connect the physical world to data.
Sensors, devices and real-time systems.

SIX ADVANCED PROJECTS — CHOOSE ANY TWO

01 **Smart Home Automation & Monitoring System**

02 **Real-Time Environmental Monitoring Network**

03 **Smart Agriculture Monitoring & Irrigation System**

04 **Vehicle / Asset Tracking System with Geofencing**

05 **Industrial Equipment Health Monitoring**

06 **Smart Energy Usage Monitoring & Optimization**

INTERNSHIP	REQUIRED TASKS	FOCUS
IoT	Complete any 2 projects	Sensors · Embedded Systems · Connectivity · Cloud Ingestion · Automation

INTERNSHIP INSTRUCTIONS

Your Internship Tasks

Select and complete **any 2 projects** from the task list. Each should involve real (or realistically simulated) sensor data flowing into a system that does something with it — not just a single sensor printing to a serial monitor.

Design	Wire	Program	Connect	Automate	Monitor

EVERY PROJECT SHOULD INCLUDE

- [ ] Real or realistically simulated sensor data
- [ ] Reliable device-to-cloud (or device-to-server) connectivity
- [ ] Data stored, not just displayed once and discarded
- [ ] Some automated action taken based on the data
- [ ] Handling of sensor noise or missing readings
- [ ] A dashboard or interface to view current/historical data
- [ ] Reasonable power/connectivity failure handling
- [ ] Documentation of the hardware and data flow

BEFORE YOU SUBMIT

- [ ] Complete any 2 projects from the list
- [ ] Push firmware/code to GitHub
- [ ] Include a wiring diagram or hardware setup notes
- [ ] Add a README with setup steps
- [ ] Add photos/video of the working system
- [ ] Submit details via the submission form
- [ ] Share your work on LinkedIn as required

> **Suggested technologies:** Arduino / ESP32 / Raspberry Pi · MQTT · a cloud IoT service (AWS IoT Core, Azure IoT Hub, or a simple self-hosted broker) · a time-series database.

Submit your completed work here

Once both projects are working end to end and documented, submit your project details through the official submission form.

https://forms.gle/vxL5JE8cvRXXfDBv8

> **A note on quality.** No hardware on hand is fine — a well-built simulator that models real sensor behavior (noise, drift, failure) is a legitimate substitute. What matters is the data pipeline and the automation built on top of it.

01 Smart Home Automation & Monitoring System

Build a system that monitors home conditions (temperature, motion, doors) and automates responses.

REQUIREMENTS

- At least three distinct sensor types feeding the system
- Automated rules (e.g. turn on fan above a threshold)
- Historical data view with trends
- Handle a sensor going offline gracefully
- Real-time data ingestion to a central system
- Manual override from a dashboard or app
- Alerting for abnormal conditions (e.g. door left open)
- Document the automation rules clearly

Focus: Sensor fusion, rule-based automation and a real monitoring dashboard.

02 Real-Time Environmental Monitoring Network

Build a network of multiple sensor nodes reporting environmental data (air quality, temperature, humidity) to a central platform.

REQUIREMENTS

- Multiple independent sensor nodes
- Centralized ingestion and storage
- Threshold-based alerting per location
- Historical trend charts per node
- Each node identified and tracked separately
- Aggregate and per-node views
- Handle nodes going offline without breaking the dashboard
- Document the network architecture

Focus: Multi-node data ingestion, per-device tracking and network-wide observability.

03 Smart Agriculture Monitoring & Irrigation System

Build a system that monitors soil and weather conditions and automates irrigation decisions.

REQUIREMENTS

- Soil moisture and weather-relevant sensor data
- Manual override and scheduling
- Water-usage tracking over time
- Handle intermittent connectivity in a field setting
- Automated irrigation triggering based on real thresholds
- Historical data on soil conditions and irrigation events
- Alerting for sensor failure or extreme readings
- Document the decision logic for irrigation

Focus: Sensor-driven automation, decision logic and field-realistic connectivity handling.

04 Vehicle / Asset Tracking System with Geofencing

Build a system that tracks the location of a vehicle or asset in real time and enforces geofence rules.

REQUIREMENTS

- Real-time GPS location reporting
- Geofence definition and entry/exit detection
- Historical route / trip playback
- Battery/power-usage awareness in the reporting interval
- Live map view of current location
- Alerting on geofence violation
- Handle GPS signal loss gracefully
- Document the tracking and alerting logic

Focus: Real-time geolocation, geofencing logic and route history.

05 Industrial Equipment Health Monitoring

Build a predictive-maintenance-style system that monitors equipment vibration/temperature and flags developing issues.

REQUIREMENTS

- Continuous sensor data collection (vibration/temperature)
- Anomaly detection against that baseline
- Historical trend view per piece of equipment
- Handle sensor dropout without false alarms
- Baseline "normal" behavior established from data
- Alerting before failure, not just after
- Distinguish transient spikes from sustained drift
- Document the anomaly-detection approach

Focus: Baseline modeling, anomaly detection and predictive-maintenance-style alerting.

06 Smart Energy Usage Monitoring & Optimization

Build a system that monitors power usage per device/circuit and surfaces optimization opportunities.

REQUIREMENTS

- Per-device or per-circuit power monitoring
- Identify high-consumption devices/times
- Alerting on unusual consumption spikes
- Handle a monitoring gap without corrupting totals
- Real-time and historical usage views
- Cost estimation based on usage and tariff
- Automated action for at least one device (e.g. scheduled shutoff)
- Document the savings opportunities found

Focus: Energy metering, usage analytics and automation-driven optimization.

FINAL STEP

Ready to Submit?

Verify everything below before you send your work in.

SUBMISSION

- [ ] GitHub repository
- [ ] Wiring diagram or setup notes
- [ ] README with setup steps
- [ ] Photos/video of the working system
- [ ] Submission form completed
- [ ] LinkedIn post where required

SYSTEM

- [ ] Data stored for later analysis
- [ ] Automated action taken based on data
- [ ] Dashboard shows current and historical data

DEVICE

- [ ] Sensor data collected reliably
- [ ] Noise / missing readings handled
- [ ] Hardware or simulator documented

CONNECTIVITY

- [ ] Device-to-cloud connection is reliable
- [ ] Reconnects after a dropped connection
- [ ] Data loss during outages minimized

Important. Complete any 2 projects. A convincing simulator is acceptable where hardware isn't available — a real, working data pipeline and automation layer is what's being assessed.

Submission Form

Submit your repository, live link and screenshots here.

https://forms.gle/vxL5JE8cvRXXfDBv8

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