**Project Title**: Environmental Monitoring based on IOT

**Project Steps**

**Phase 1:**Problem Definition and Design Thinking

In this part you will need to understand the problem statement and create a document on what have you understood and how will you proceed ahead with solving the problem. Please think on a design and present in form of a document.

Project Definition: The project involves setting up IoT devices to monitor environmental conditions in public parks, including temperature and humidity. The primary objective is to provide real-time environmental data to park visitors through a public platform, enabling them to plan their outdoor activities accordingly. This project includes defining objectives, designing the IoT sensor system, developing the environmental monitoring platform, and integrating them using IoT technology and Python.

Design Thinking:

Project Objectives: Define objectives such as real-time environmental monitoring, aiding park visitors in activity planning, promoting outdoor experiences, and enhancing visitor satisfaction.

IoT Devices Designs: Plan the deployment of IoT sensors (e.g., temperature and humidity sensors) in public parks.

Environmental Monitoring Platform: Design a web-based platform to display real time environmental data to the public.

Integration Approach: Determine how IoT devices will send data to the environmental monitoring platform.

**Phase 2:** Innovation

1. Connect Sensors to IoT Hardware:

- Wire or interface the sensors with the IoT hardware. Depending on the sensors and

hardware, you may need to use analog or digital interfaces like GPIO pins or I2C.

2. Develop Firmware/Software:

- Write code or use existing libraries to read data from the sensors. Develop software that

formats this data and sends it to an IoT cloud platform. You might use languages like Python,

C/C++, or JavaScript.

3. IoT Cloud Platform:

- Select a cloud-based IoT platform that supports data ingestion, storage, and analytics.

Examples include AWS IoT, Microsoft Azure IoT, or Google Cloud IoT. Create an account

and set up a new project.

4. Register IoT Devices:

- Register your IoT devices (the hardware with sensors) on the chosen IoT platform. Each

device should have a unique identifier and security credentials for secure data transmission.

5. Data Transmission:

- Use IoT communication protocols like MQTT, CoAP, or HTTP to send data from your IoT

hardware to the cloud platform. Ensure data is transmitted securely, often using encryption.

6. Data Storage and Processing:

- Set up data storage on the IoT platform, which may include cloud-based databases, datalakes, or storage services. Configure data processing pipelines if needed.

7. Data Visualization and Analysis:

- Create dashboards or use built-in tools on the IoT platform to visualize and analyze the

collected environmental data. Set up alerts for threshold violations if necessary.

8. User Interface (Optional):

- Develop a user-friendly interface, such as a web application or a mobile app, to allow

users to access and interact with the environmental data.

9. Power Supply and Enclosure:

- Ensure a reliable power supply for your IoT devices. For outdoor installations, consider

weatherproof enclosures to protect hardware.

10. Testing and Calibration:

- Thoroughly test your monitoring system to ensure it collects accurate data. Calibrate

sensors as needed to maintain data accuracy.

11. Deployment:

- Install your environmental monitoring system at the desired location(s). Ensure allcomponents are securely mounted and connected.

12. Monitoring and Maintenance:

- Continuously monitor the system's performance and data quality. Perform regular

maintenance tasks such as battery replacement or software updates.

13. Data Accessibility and Sharing:

- Make the environmental data accessible to authorized users, stakeholders, or the public,

based on your project's goals and requirements.

14. Compliance and Regulations:

- Ensure your monitoring system complies with any relevant environmental regulations,

data privacy laws, and security standards.

**Phase 3:** Development part 1

In this part you will begin building your project.

Start building the IoT-enabled Environmental Monitoring in Parks system.

Deploy IoT devices (e.g., temperature and humidity sensors) in various locations within public parks to measure environmental conditions.

Develop a Python script on the IoT devices to send real-time environmental data to the monitoring platform.

https://github.com/mohamedjaleel1/NM/blob/main/iot%20p-3.docx

**Phase 4:** Development part 2

In this part you will continue building your project.

Continue building the project by developing the environmental monitoring platform.

Use web development technologies (e.g., HTML, CSS, JavaScript) to create a platform that displays real-time environmental data.

Design the platform to receive and display real-time temperature and humidity data from IoT devices.

https://github.com/mohamedjaleel1/NM/blob/main/IOT\_Phase4.docx

**The readme file gives the detailed information about the execution of the code:**

<https://github.com/mohamedjaleel1/NM/blob/main/README.md>