

# **PRANVEER SINGH INSTITUTE OF TECHNOLOGY**

## **Mini Project Proposal (BCS-554)**

**Team Id:**

**Team Details:**

<b>S No</b>	<b>Full Name</b>	<b>University Roll No</b>	<b>Branch &amp; Section</b>	<b>Mob No</b>
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**Project Title:** Weather Monitoring Station

**Domain: (Select all relevant Options)**

1. Artificial Intelligence/ Machine Learning.	2. Computer Vision / Image Processing/ Deep Learning
3. Blockchain	4. <b>Internet of Things</b>
5. Natural Language Processing	6. <b>Big Data / Cloud Computing</b>
7. <b>Software-Web Application</b>	8. Software-Mobile Application
9. Others (Specify if any):	

### **Problem Statement:**

In many rural and urban areas, there is a lack of real-time, accurate, and localized weather data. This impacts agriculture, urban planning, disaster management, and daily decision-making. Most existing weather stations are expensive, limited in number, or provide delayed updates, making them inaccessible for small communities or individuals. Hence, there is a need for a cost-effective, easily deployable, and real-time weather monitoring station.

## **Proposed Solution:**

The proposed solution is a low-cost, IoT-based weather monitoring station that gathers real-time environmental data such as temperature, humidity, air pressure, and rainfall. This system will leverage various sensors connected to NodeMCU, which transmits the data to the cloud via Wi-Fi. The data can be accessed by users through ThingSpeak, providing real-time weather updates and historical trends.

This system can be installed in multiple locations to provide localized weather insights, with the potential to integrate with national or global weather networks. The data gathered can help farmers, city planners, or the general public make informed decisions.

## **Unique/Distinctive feature of the solution:**

- **Real-Time Data Collection and Visualization:** The system provides instant access to real-time weather data through an app or web dashboard.
- **Low-Cost and Scalable:** Designed using cost-effective components, making it accessible for individuals, farmers, or small communities. It can be easily scaled by deploying multiple units across different areas.
- **Custom Alerts:** Users can set threshold values (e.g., for high temperature or humidity) and receive alerts via SMS or email when the weather crosses those limits, improving proactive decision-making.
- **Solar-Powered Option:** To promote sustainability, the station can be designed to be powered by solar energy, enabling remote installations without access to a power grid.
- **Data Logging and Analytics:** Historical weather data is stored in the cloud, providing trend analysis and forecasts based on past data.
- **Modular Design:** The system can easily be upgraded by adding additional sensors (e.g., for air quality, wind speed) or integrating new technologies like machine learning for weather prediction.

## **Tools/Technology Uses:**

### **1) Hardware Requirements (Minimum Requirements):**

- a) NodeMCU
- b) BMP Sensor
- c) DHT11 Sensor
- d) Rain Sensor FC-37
- e) Jumper wires
- f) Breadboard

### **2) Software Requirements (Minimum Requirements):**

- a) Arduino IDE
- b) ThingSpeak
- c) Proteus(IoT circuit simulator)
- d) Visual Studio Code