DATE	28-02-2026
TEAM ID	LTVIP2026TMIDS90651
PROJECT NAME	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
MAXIMUM MARKS	2 MARKS

3.2 - Solution Requirement:

The proposed Weather-Based Prediction of Wind Turbine Energy Output System aims to provide an accurate, reliable, and user-friendly solution for forecasting power generation using weather data and historical turbine performance. The solution must satisfy both functional and non-functional requirements to ensure effective operation, usability, and performance.

3.2.1 Functional Requirements:

The system should be able to:

1. Accept and store historical weather data and wind turbine performance data.
2. Preprocess data by handling missing values, removing noise, and normalizing inputs.
3. Analyse key weather parameters such as wind speed, wind direction, temperature, pressure, and humidity.
4. Train machine learning models using historical data for power output prediction.
5. Generate accurate predictions of wind turbine energy output for given weather conditions.

3.2.2 Non-Functional Requirements:

The system should:

1. Be easy to use with a simple and intuitive user interface.
2. Provide fast response time for data processing and prediction generation.
3. Ensure accuracy and reliability of predictions.
4. Be scalable to handle large datasets from multiple wind turbines.
5. Maintain data security and integrity.

3.2.3 Hardware Requirements:

- Processor: Intel i3 or higher
- RAM: Minimum 8 GB
- Storage: Minimum 256 GB HDD/SSD
- System: Standard desktop or laptop computer

3.2.4 Software Requirements:

- Operating System: Windows / Linux
- Programming Language: Python
- Libraries: Pandas, NumPy, Scikit-learn, Matplotlib, Seaborn (optional), Flask/Streamlet (for UI, if used)
- Development Environment: Anaconda / Jupiter Notebook / VS Code
- Database (Optional): MySQL / SQLite / CSV files