Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	31 January 2026
Team ID	LTVIP2026TMIDS76798
Project Name	Electric Motor Temperature Prediction using Machine Learning
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Access Management**	- User Login via secure credentials to access the dashboard. - Session management for Industrial Operators.
FR-2	**Predictive Inference**	- **Manual Prediction:** Input 11 features via JSON/Form for specific testing. - **Sensor Prediction:** Input 8 key sensor values (Ambient, Torque, Coolant, etc.) for real-time calculation.
FR-3	**Data Preprocessing**	- Automatic feature scaling using StandardScaler (scaler.pkl). - Handling of missing values and null data points in input.
FR-4	**Result Visualization**	- Real-time display of predicted temperature in Celsius (°C). - Error messaging for invalid or out-of-range sensor inputs.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-5	Model Training	- Ability to retrain models using updated measures_v2.csv data. - Exporting of trained weights to .pkl files for production use.

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The interface (index.html) must be intuitive, using a modern dark theme and Inter font for high readability in industrial control rooms.
NFR-2	Security	The system must validate all inputs to prevent injection attacks and ensure only authorized personnel can trigger model retraining.
NFR-3	Reliability	The predictive engine must consistently load the best_model.pkl and handle exceptions without crashing the Flask server.
NFR-4	Performance	The inference (prediction) time should be less than 500ms to ensure real-time responsiveness for critical motor monitoring.
NFR-5	Availability	The system should be hosted on a stable platform (like IBM Watson or a local server) with 99.9% uptime for continuous motor tracking.

FR No.	Non-Functional Requirement	Description
NFR-6	**Scalability**	The backend architecture must allow for the integration of additional sensor types (e.g., vibration sensors) in the future without major code restructuring.