



**UNDERGRADUATE THESIS**

**GOODS DEMAND PREDICTION SYSTEM AND SAFETY STOCK USING WEIGHTED MOVING AVERAGE AND REORDER POINT  
(CASE STUDY: PT. BINA INFORMATIKA SOLUSI MADIUN)**

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## APPROVAL SHEET

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Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

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## ABSTRACT

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## ABSTRACT

PT. Bina Informatika Solusi Madiun, a branch office providing fiber optic internet services, faces challenges in managing the inventory of drop core cables and ONT (Optical Network Terminal) devices due to irregular demand patterns (lumpy demand) and the absence of a structured prediction system. This study aims to develop a web-based goods demand prediction system implementing the Weighted Moving Average (WMA) method, with its results directly integrated into the calculation of safety stock and reorder point, which are updated dynamically each time a prediction is executed. The system was built using the Laravel framework with a MySQL database and implemented for two types of goods, namely drop core cables and ONT, using historical transaction data from January 2025 to May 2026. Testing was conducted in three stages: black box testing, WMA accuracy testing with window size variations of 3, 4, and 5, and usability testing using the System Usability Scale (SUS) method. Additional validation was performed using a public pharmaceutical sales dataset (category NO2BE) to confirm the consistency of the algorithm implementation. Black box testing across 21 functional scenarios yielded a 100% success rate. Accuracy testing produced the best MAPE value of 21.89% (fair category) for drop core cables and 39.08% (fair category) for ONT, both achieved with window size 5. Usability testing produced an average SUS score of 80.0, classified as good, indicating that the system meets usability standards from the perspective of direct users at PT. Bina Informatics Solutions Madiun.

**Keywords:** Weighted Moving Average, Safety Stock, Reorder Point, Inventory Prediction, Lumpy Demand, Fiber Optic

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