

# **Regulatory Compliance and Model Risk Management Report for Credit Risk Modeling**

## **1 Model Purpose & Scope**

This document describes a credit risk model developed to estimate the probability of loan default. The model supports lending decisions and is designed in alignment with SR 11-7 Model Risk Management guidance.

## **2 Data Description & Governance**

- Dataset source (Kaggle German Credit – simulated)
- Number of records (1000)
- Missing data handling

Missing values were handled using domain-appropriate techniques to ensure data quality and auditability.

## **3 Exploratory Data Analysis (EDA) Summary**

- Default rate
- Class imbalance
- Key risk factors
- Correlation analysis

## **4 Feature Engineering**

- Ratio-based features
- Interaction features
- Log/sqrt transformations
- Data dictionary

Engineered features were reviewed to avoid proxy variables for protected demographic attributes.

## **5 Model Development**

- Logistic Regression (baseline)
- LightGBM (advanced)
- Cross-validation

- Hyperparameter tuning

## 6 Model Validation & Performance

- AUC results

- Calibration

- Stability

Model performance was evaluated using stratified cross-validation to ensure robustness and generalization.

## 7 Fairness & Interpretability

- Demographic group (Sex)

- Disparate Impact

- Equal Opportunity

- SHAP-style explanations

- Adverse action reasons

## 8 Model Limitations & Monitoring

- Proxy target limitation

- Need for real default data

- Monitoring metrics (AUC, fairness, drift)

## 9 Governance & Approval

The model follows best practices aligned with SR 11-7 Model Risk Management standards.