**Department of Electrical and Computer Engineering**
**North South University**

# Senior Design Project

# Automatic Fault Detection in Three-phase Transmission Lines

**Md. Rakibul islam** **ID# 1813378643**

**Md. Sadaf islam** **ID# 1811681643**

**Imran islam** **ID# 1811457043**

**Faculty Advisor:**

**Dr. K.M.A. Salam**

**Professor**

**Department of Electrical and Computer Engineering**

**Summer, 2023**

# LETTER OF TRANSMITTAL

December, 2023

To

Dr. Rajesh Palit
Chairman,
Department of Electrical and Computer Engineering
North South University, Dhaka

Subject: **Submission of Capstone Project Report on "Automatic Fault Detection in Three-phase Transmission Lines"**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on **"Automatic Fault Detection in Three-phase Transmission Lines"** as a part of our BSc program. The report deals with Electricity Transmission Line Security System. This project was very much valuable to us as it helped us gain experience from practical field and apply in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

.....

Md. Rakibul islam
ECE Department
North South University, Bangladesh

.....

Md. Sadaf islam
ECE Department
North South University, Bangladesh

.....

Imran islam
ECE Department
North South University, Bangladesh

# APPROVAL

Md. Rakibul islam (ID # 1813378643), Md. Sadaf islam (ID # 1811681643) and Imran islam (ID # 1811457043) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled "Automatic Fault Detection in Three-phase Transmission Lines" under the supervision of Dr. K.M.A Salam partial fulfillment of the requirement for the degree of Bachelors of Science in Electrical & Electronic Engineering and has been accepted as satisfactory.

**Supervisor's Signature**

…….

**Dr. K.M.A Salam**

**Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

**Chairman's Signature**

…….

**Dr. Rajesh Palit**

**Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

# DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

**1. Md. Rakibul islam**

---

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

**2. Md. Sadaf islam**

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

**3. Imran islam**

# ACKNOWLEDGEMENTS

We would like to express our heartfelt gratitude towards our project and research supervisor, Dr. K.M.A Salam, Professor, Department of Electrical and Computer Engineering, North South University, Bangladesh, for his invaluable support, precise guidance and advice pertaining to the experiments, research and theoretical studies carried out during the course of the current project and also in the preparation of the current report.

Furthermore, we would also like to thank the Department of Electrical and Computer Engineering, North South University, Bangladesh for facilitating the research. We would also like to thank our electronics lab instructors for helping us at various times in this project. We would also like to thank our parents for their countless sacrifices and continual support.

# ABSTRACT

## Automatic Fault Detection in Three-phase Transmission Lines

This report presents the prototype design and implementation of 'Automatic Fault Detection in Three-phase Transmission Lines' using Arduino as microcontroller. The goal of the proposed Transmission Line Fault Detection System is to deliver an automated fault detection solution that can quickly and accurately identify and locate faults on transmission lines. The primary objective of this is to establish a rapid and precise identification and localization of faults within transmission lines, ultimately ensuring a seamless and uninterrupted flow of electricity. A prototype of this scheme is developing and testing on a simulated transmission line setting to confirm the system's performance. The project provides an automatic tripping mechanism for the three-phase supply system to prevent defective damage. Various fault scenarios were artificially introduced to evaluate the system's ability to accurately detect and locate faults. This process allows for a comprehensive assessment of the system's efficiency and reliability. Focus of this project was to enhance the reliability of three-phase transmission lines by employing voltage imbalance and phase imbalance factors for fault detection. Detailed analysis and calibration of these factors enable the system to swiftly identify faults and initiate timely corrective actions ensuring the uninterrupted flow of electricity within power networks. This proactive approach minimizes disruptions and potential damage, contributing to improved grid stability and efficiency.