



FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT

**DESIGN AND DEVELOPMENT OF A SENSOR-BASED ALERT SECURITY
SYSTEM FOR DOMESTIC SOLAR PANELS**

BY

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BU/UP/2023/1006

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**A FINAL YEAR PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF
ELECTRICAL ENGINEERING IN PARTIAL FULFILMENT OF THE AWARD OF
A DIPLOMA IN INDUSTRIAL ELECTRONICS AND ELECTRICAL
ENGINEERING OF BUSITEMA UNIVERSITY**

JUNE 2025

ABSTRACT

This project is about a sensor-based alert security system for domestic solar panels. The system uses infrared technology as well as vibration sensor technology to pick signals of threat to the solar panels when touched and also when it senses people within the perimeters of the solar panel installation. The signals are then sent to the Arduino uno that processes then and sends information to the buzzer to make sound and to the LED for visual signal to show that there is a threat of theft of the solar panel.

This system is specifically made for domestic solar panel installation to solve cases of theft. By integrating these sensors with the solar panel, the system is capable of triggering alarms to alert the owners of any attempted theft. In this project, infrared sensors detect motion using infrared radiations emitted by humans within the specified perimeter and the vibration sensor detects physical contact with the solar panels if the system is bridged.

The system offers a solution to theft and vandalism of solar panels in homes as well as reliability through real-time monitoring and alerts.

DECLARATION.

I NAMUTALA AGATHA do declare that this project report is my original work and has never been published and / submitted for any award of a diploma to any other university or higher institution of learning.

Signature:.....

Date:.....

ACKNOWLEDGEMENT.

I give thanks to the Almighty God for the provision of life and knowledge which has helped me up to the completion of this project. I as well greatly appreciate my parents for the financial, spiritual and emotional support that even amidst challenges they have stood by me to see me go through.

Appreciation also goes to my project supervisors Mr.Mugwanya Patrick and Mr.Mbabaali Frank, my group mates for the support through the process of coming up with the project and advice when needed. To the Head-Of-Department Electrical engineering Mr.Kilama George for guidance and insights on concepts of research and project management as well as technical knowledge in design and systems.

APPROVAL.

This is to certify that this project report titled “Design and development of a sensor-based alert security system for domestic solar panels” has been done under my supervision and is now ready for examination.

MAIN SUPERVISOR.

Mr.Mugwanya Patrick

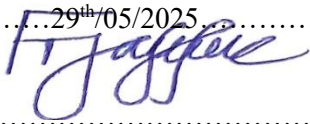
Sign:.....

Date:.....

CO-SUPERVISOR.

Mr. MBABAALI FRANK

Date: 29th/05/2025.....

Signature:.....

DEDICATION.

I dedicate this report to my dear father Wafula Bernard Najoni Kato who has always supported me in every step I take and encouraging me in every situation and to my fellow group mates and classmates who always worked with me and challenged me to get wider concerning my project.

Further dedication goes to my project supervisors Mr.Mugwanya Patrick and Mr.Mbabaali Frank who have guided me and mentored me during the project development.

Finally I dedicate this project report to the staff of Busitema University for giving me the opportunity to come up with the project idea and accepted me to take it on as my final year project.

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LIST OF ACRONYMS.

ABBREVIATION	FULL NAME
LED	Light Emitting diode
IDE	Integrated Development Environment
PIR	Passive Infrared
GSM	Global System For Mobile Communication