



**BUSITEMA
UNIVERSITY**
Pursuing excellence

**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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REG NO: BU/UP/2023/0982

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**FINAL YEAR PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF
ELECTRICAL ENGINEERING IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DIPLOMA IN INDUSTRIAL
ELECTRONICS AND ELECTRICAL ENGINEERING OF BUSITEMA
UNIVERSITY.**

DECLARATION

I **ASHABA AHEEBWA** do hereby declare that the contents of this project report are my original work done through research from various documents like textbooks which will be showed among the references and has not been submitted for any other award of diploma to any other university or institution of higher learning. With guidance from my project supervisors MR.

Mugwanya Patrick and Mr. Frank Mbabaali, I have come up with this content on my project.

Signature.....

Date

DEDICATION

I dedicate this report to my dear parents Mr. ROBERT M. AND Mrs. NAMARA J. Who always supported in every step I take and encouraging me in various situations, my fellow classmates who always challenged me to get wider knowledge concerning my project?

Further dedication is to my supervisors Mr. Patrick Mugwanya and Mr. Frank Mbabali who have guided me and mentoring me during project work at campus

Finally, with a lot of appreciation I dedicate this report to all the staff and department of Busitema University who gave me an opportunity to come up with project ideas and accepted me to take it on as my final year projects.

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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 sincerely appreciate the invaluable guidance provided by my project supervisors, Mr. Mugwanya Patrick and Mr. Frank Mbabaali, whose expertise and support have been instrumental in the successful development of my project. Their dedication and insights have shaped this project into a meaningful accomplishment.

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Finally, I extend my appreciation to my Head of Department, Eng. Kilama George, whose continuous guidance, knowledge, and expertise in research and project management have significantly enriched my understanding. His technical insights have been invaluable in shaping the design and execution of the system.

APPROVAL

This is to certify that this project and design 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. PATRICK MUGWANYA

Date

Signature

CO SUPERVISOR:

MR. FRANK MBABALI

Date: 29th /05/2025

Signature.....

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LIST OF ACROYNMS USED.

ABBREVIATION	FULL FORM
GSM	Global system for mobile communication
LED	Light emitting Diodes
Wi-Fi	Wireless Fidelity
PIR	Passive Infrared
SMS	Short Messages

ABSTRACT.

This project proposes a sensor-based alert security system for domestic solar panel. This will leverage infrared motion sensor detection technology and vibration sensor technology to detect and deter potential vandalism and theft attempts.

This system is specifically tailored for domestic solar panel installation. By integrating these sensors with the solar panel, the device will be capable of triggering alarms to alert the owners on any attempted theft. In this project we are to use infrared motion sensor and the vibration which is to detect physical contact with the panels if the system is bridged. The signal is then to be sent to the alarm via the microcontroller to give out sound to the alert the people.

The system consists of an infrared motion sensor, vibration sensor, microcontroller (Adriano Uno) and buzzer.

The sensor-based security system for solar panels offers numerous benefits including:

- Improved performance monitoring
- Proactive fault detection
- Enhanced maintenance ➤ Increased energy efficiency
- Cost savings.

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