

**DEVELOPMENT OF INTERNET OF THINGS (IOT) - BASED  
MICROCLIMATIC MONITORING SYSTEM FOR HYDROPONICS  
GREENHOUSE MANAGEMENT**

**ALLYSA MAY C. GUILLERMO**


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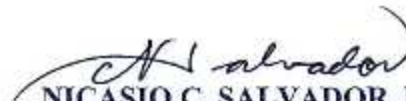
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**ACCEPTANCE SHEET**


This undergraduate thesis entitled "**DEVELOPMENT OF INTERNET OF THINGS (IOT) - BASED MICROCLIMATIC MONITORING SYSTEM FOR HYDROPONICS GREENHOUSE MANAGEMENT**", prepared and submitted by **ALLYSA MAY C. GUILLERMO** in partial fulfilment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AB STRUCTURES AND ENVIRONMENT ENGINEERING)**, is hereby accepted:


  
**JONATHAN V. FABULA, Ph.D.**  
Member, Advisory Committee  
1 - 26 - 2024  
Date Signed

  
**NICASIO C. SALVADOR, M.Sc.**  
Member, Advisory Committee  
1 - 26 - 2024  
Date Signed

  
**ELIZA E. CAMASO, M.Sc.**  
Chair, Advisory Committee  
1 - 26 - 2024  
Date Signed

Accepted as partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AB STRUCTURES AND ENVIRONMENT ENGINEERING)**:

  
**ELMAR M. VILLOTA, Ph.D.**  
Head, Department of Agricultural and  
Biosystems Engineering  
01 - 30 - 24  
Date Signed

  
**THEODY B. SAYCO, Ph.D.**  
Dean, College of Engineering  
01 - 30 - 24  
Date Signed

## **BIOGRAPHICAL SKETCH**

The author, Allysa May C. Guillermo, was born on October 19, 2001, in San Jose City, Nueva Ecija. She is the only child of Mr. Rodrigo D. Guillermo and Mrs. Cinderella C. Guillermo. She was raised in Barangay Magtanggol, Science City of Muñoz, Nueva Ecija. Throughout her educational journey, the author has continuously demonstrated a remarkable commitment to learning and achievement.

She attended her early academic years at Magtanggol Elementary School, where she completed her primary education from 2007 to 2013, which served as the foundation for her academic excellence. In 2013, she continued to excel during her junior high school in Adonai Integrated Montessori School and graduated in 2017, marked by consistent honors.

Throughout her senior years at Muñoz National High School – Senior High School MAIN, spanning from 2017 to 2019, she pursued the Science, Technology, Engineering, and Mathematics (STEM) track, experiencing a period where the author truly flourished. Actively participating in various school organizations, she developed her leadership skills and fostered a personality suited to her chosen field.

Eager to delve deeper into her academic pursuits, the author embarked on her higher education journey in 2019 at Central Luzon State University, taking Bachelor of Science in Agricultural and Biosystems Engineering, Major in AB Structures and Environment Engineering. Her chosen path reflects her desire to merge her passion for engineering science with a focus on agricultural innovation and technology.

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## ABSTRACT

**GUILLERMO, ALLYSA MAY C.**, Department of Agricultural and Biosystem Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **February 2024, DEVELOPMENT OF INTERNET OF THINGS (IOT) - BASED MICROCLIMATIC MONITORING SYSTEM FOR HYDROPONICS GREENHOUSE MANAGEMENT**

Adviser: ELIZA E. CAMASO, M.Sc.

Monitoring the microclimate in a greenhouse stands as a critical factor in ensuring the ideal conditions necessary for fostering robust plant growth and maximizing productivity. When this monitoring lacks consistency, the ability to identify essential adjustments in microclimate becomes significantly challenging. This study delved into revolutionizing hydroponic greenhouse management by introducing an IoT-based microclimatic monitoring system, addressing the limitations of manual monitoring approaches. By focusing on real-time data accessibility through internet connectivity and mobile devices, the system replaced human-dependent monitoring, ensuring accuracy and reliability while eliminating the need for frequent on-site visits. The study involved design, testing, and implementation of the IoT system, integrating various sensors and control mechanisms for optimal plant growth subjected in hydroponic greenhouse.

The developed IoT-based microclimatic monitoring system offers a promising and advanced approach to managing hydroponic greenhouse. The cultivation of lettuce in hydroponic was used in the study to evaluate the performance of the system. The results consistently demonstrate significant differences across all measured aspects - including height, leaf diameter, leaf count, and total yield - between the lettuce cultivated in the

experimental setup, which incorporated IoT technology, and the conventional setup. The obtained p-values indicate highly significant differences, strongly suggesting that the influence of the IoT system played a crucial role in these outcomes.

In essence, the application of IoT-based microclimatic monitoring system in the experimental setup appears to have positively impacted the growth, development, and overall yield of lettuce compared to the conventional setup without IoT implementation. The lettuce from the experimental setup exhibited substantially better growth metrics and significantly higher yield, making a strong case for the effectiveness of employing IoT system in optimizing hydroponic greenhouse production.

Keyword: microclimate monitoring; IoT system; hydroponic greenhouse; plant growth

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