COMPREHENSIVE SEMESTRAL REPORT ON FIELD PRACTICE AT CENTER FOR RENEWABLE ENERGY AND TECHNOLOGY (CREaTe)

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An Undergraduate Field Practice Manuscript Submitted to the Faculty of the Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija in Partial Fulfilment of the Requirements for the Degree of

BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING
(Agricultural Power, Energy and Machinery Engineering)

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ACCEPTANCE SHEET

This field practice manuscript entitled, **"COMPREHENSIVE SEMESTRAL REPORT ON FIELD PRACTICE AT CENTER FOR RENEWABLE ENERGY AND TECHNOLOGY (CREaTe)"** prepared and submitted by **DIONEVEL JOB R. YARCIA** as partial fulfilment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (Agricultural Power, Energy and Machinery Engineering)**, is hereby accepted:

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BIOGRAPHICAL SKETCH

Dionevel Job Romanban Yarcia was born on December 11, 1998, in San Rafael, San Felipe, Zambales. He is the second eldest child of the late Mr. Deonie Sadiarin Yarcia and Evelyn Romanban Yarcia, and a beloved brother to his siblings, Ephraim Dioeve, Imman Dieve, and Evenie Jireh.

In 2010, Dionevel graduated as salutatorian from San Isidro Integrated School in San Isidro, Diffun, Quirino. That same year, he began his high school education at Diffun National High School in Andres Bonifacio, Diffun, Quirino. For four years, he served as an editorial cartoonist for the school paper, The Gentle Breeze, and graduated in 2014, ranking Top 9 in his class.

Entering college marked a transformative chapter in his life, filled with new challenges and opportunities. As he stepped onto the campus of Central Luzon State University, he carried a blend of ambition and curiosity. With a determined spirit, he began his journey in higher education, pursuing a Bachelor of Science in Agricultural and Biosystems Engineering. For five years, Men's Dormitory 8 and 9 ACACIA became his home, where he not only found shelter but also built lasting friendships and unforgettable memories amidst the hustle and bustle of university life.

During his college years, he joined the United Ilocandia CLSU Chapter in 2017, a brotherhood that greatly influenced his university experience. Demonstrating leadership and dedication, he became the president of the organization for the academic year 2023-2024. Through his involvement in the said organization, this provided him with invaluable support and opportunities for growth. He also actively participated in the CLSU Math and Physics Department Math Olympics in 2018 and won 3rd Place.

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He also dedicates this success to his late father, Deonie S. Yarcia, whose memory has been a constant source of motivation and inspiration. His father's legacy and values have driven him to persevere and achieve his goals.

To his mother, Evelyn R. Yarcia, for her endless patience, financial support and emotional encouragement. Her steadfast belief in his potential and her sacrifices made this achievement possible.

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ABSTRACT

YARCIA, DIONEVEL JOB R., Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **JULY 2024, COMPREHENSIVE SEMESTRAL REPORT ON FIELD PRACTICE AT CENTER FOR RENEWABLE ENERGY AND TECHNOLOGY (CREaTe)**

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The activities on the field practice program were agricultural and biosystems-related activities conducted at CLSU Center for Renewable Energy and Technology (CREaTe). The field practice was focused on four activities which were the performance evaluation of different sizes 3" and 4" centrifugal pumps as hydro turbine, assistance in design, fabrication and performance evaluation of biomass shredder, assistance in performance evaluation of water wheel using DC generator and assistance in design, fabrication and performance evaluation of hydro vortex turbine.

For Activity 1, the student evaluated different sizes of centrifugal pump as a hydro turbine. The calculated hydraulic efficiency of the 3" centrifugal pump as a hydro turbine was 83.32% with the total power efficiency determined to be 86.2% then the hydraulic efficiency of the 4" centrifugal pump was 93.71% with a total power efficiency of 91%.

For Activity 2, the student assisted on the testing of the biomass shredder to determine the performance of the machine based on PAES criteria for biomass shredder in terms of shredding efficiency. It was found that the biomass shredder satisfied the

minimum requirement of 90% for efficiency. These results show that it is an effective choice for biomass processing requirements.

For Activity 3, the student assisted with the testing of the water wheel turbine using a DC generator. The power produced by the turbine lit up one 100W and one 25W 220V-AC bulb.

For Activity 4, the student assisted on the testing of the hydro vortex turbine. To produce more power output the student trainee helped modified the blade.

Keywords: Field practice; pump as turbine; centrifugal pump

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