

**LINUX MASTERY THROUGH EXPERIENTIAL LEARNING: A CTF-BASED APPROACH**

**APPLIED PROJECT**

B.Sc. Computer Science

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**2025**

**ASHESI UNIVERSITY**

**LINUX MASTERY THROUGH EXPERIENTIAL LEARNING: A CTF-BASED APPROACH**

**APPLIED PROJECT**

APPLIED PROJECT submitted to the Department of Computer Science & Information Systems, Ashesi University in partial fulfillment of the requirements of the award of Bachelor of Science degree in Computer Science.

**David Abeiku Saah**

**2025**

# DECLARATION

I hereby declare that this APPLIED PROJECT is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate’s Signature:

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Candidate’s Name:

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Date:

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I hereby declare that the preparation and presentation of this APPLIED PROJECT was supervised in accordance with the guidelines on supervision of APPLIED PROJECT laid down by Ashesi University.

Supervisor’s Signature:

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Supervisor’s Name:

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Date:

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# Abstract

The rapid growth of cloud computing, DevOps, and software engineering has fuelled a demand for skilled professionals proficient in Linux. However, mastering Linux, especially for beginners, presents a steep learning curve due to its command-line interface, conceptual complexity, and the vast array of tools involved. Traditional, passive learning methods often fail to equip learners with the practical skills and problem-solving abilities required in these technical domains. To address this challenge, this project proposes a novel educational approach that integrates Capture the Flag (CTF) model, typically associated with cybersecurity, into a Linux learning framework.

By adapting CTF challenges to focus on fundamental Linux concepts such as command-line proficiency, networking, system administration, and scripting, this project aims to provide a hands-on, experiential learning environment. The project will leverage established methods of experiential learning like Project-Based Learning (PBL) and Kolb’s Experiential Learning Cycle, along with a structured curriculum, interactive learning environments, and a supportive learning community, to facilitate a gradual and engaging learning experience.

This approach strives to not only mitigate the initial steep learning curve but also to cultivate a deep understanding of Linux systems, empowering individuals to confidently pursue and excel in careers related to cloud computing, DevOps, and software engineering.

**Keywords—** Linux, experiential learning, Capture the Flag (CTF), project-based learning, cloud computing, DevOps, software engineering, learning curve.

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# Chapter 1: Introduction

## Key Terms

## Related Work

## Proposed Solution

# Chapter 2: Requirements Analysis

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