Research Proposal Outline

Name: Alex Mutebe **Course**: MSc Data Science **Module**: Research Methods and Professional Practice

Project Title:

Implementing Machine Learning techniques in Enhancing Epidemic Modeling with Machine Learning

Significance to the Research Problem:

Epidemic modeling plays a crucial role in understanding disease spread and informing public health interventions. Integrating machine learning techniques can enhance accuracy, scalability, and real-time predictions.

Research Question:

How can machine learning methods improve the accuracy and efficiency of epidemic modeling?

Aims and Objectives:

- Investigate existing epidemic models and their limitations.
- Explore machine learning algorithms suitable for epidemic data.
- Develop an integrated model that combines traditional epidemiological approaches with machine learning.
- Evaluate the performance of the proposed model using historical data and simulations.

Key Literature Related to the Project:

Review relevant research papers, textbooks, and online resources on epidemic modeling, machine learning, and interdisciplinary approaches.

Methodology:

- Collect epidemiological data (e.g., infection rates, contact networks).
- Preprocess and clean the data.
- Implement machine learning algorithms (e.g., neural networks, decision trees).
- Validate the model using cross-validation and performance metrics.

Ethical Considerations and Risk Assessment:

- Address privacy concerns related to sensitive health data.
- Assess potential biases in the model.
- Consider unintended consequences of model deployment.

Description of Artefact:

Create a software library that integrates machine learning into existing epidemic modeling frameworks.

Timeline of Proposed Activities:

- Literature review: 3 weeks
- Data collection and preprocessing: 6 weeks
- Model development and evaluation: 12 weeks
- Ethical approval application: 4 weeks