Thesis Title	**Utilizing Digital Twin Technology for Improved Predictive Modelling of Energy Consumption in Smart Buildings**
Programme of Studies	BSc in Mechanical Engineering, Frederick University
Course	ME 400 Senior Project
Area of Study	Computational Building Physics – Smart Buildings
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Semester	Spring Semester 2025
Short Description	This project explores the use of Digital Twin technology combined with data-driven predictive models to improve the accuracy of energy consumption forecasting in smart buildings. Focusing on Frederick University's buildings as a reference case, the study employs Python-based time-series analysis using machine learning models such as XGBoost. Public datasets from Kaggle were used to develop and validate the predictive workflow, including data preprocessing, model training, forecasting, and performance evaluation using RMSE and MAE metrics. The results demonstrate the potential of digital twins to support data-informed energy management, reduce operational costs, and enhance decision-making in smart building applications.