



Forecasting Full-Time Equivalent Student (FTES) Data and Faculty Staffing Requirements at the Faculty of Science, Chiang Mai University



Author : Thanchanok Sunarin

Advisors : Asst. Prof. Dr. Bandhita Plubin and Assoc. Prof. Dr. Manachai Rodchuen

Department of Statistics, Faculty of Science, Chiang Mai University

thanchanok_sunarin@cmu.ac.th

ABSTRACT

The forecasting of Full-Time Equivalent Student (FTES) data and faculty staffing requirements at the Faculty of Science, Chiang Mai University, aims to: 1) Examine the methodology for calculating FTES and develop an FTES computation model using Tableau. 2) Forecast FTES data and faculty staffing requirements at the Faculty of Science, Chiang Mai University, for the academic years 2025–2029, categorized by program type, education level, and department. This study utilizes student enrollment data from the Faculty of Science, Chiang Mai University, spanning ten academic years (2014–2023). The data was obtained from the university's student database system, managed by the Office of the Registrar. For forecasting, the study employs the Google Colab online platform to develop five forecasting models: 1) Moving Average, 2) Double Exponential Smoothing, 3) Exponential Growth Trend Model, 4) Linear Trend Model, 5) Quadratic Trend Model

The findings indicate an upward trend in FTES across all education levels, with the most significant growth observed in undergraduate and master's degree programs. The Department of Physics and Materials Science and the Department of Mathematics exhibit the fastest growth rates. As FTES numbers increase each academic year, faculty staffing requirements are expected to rise accordingly.

OBJECTIVE

- 1) Examine the methodology for calculating FTES and develop an FTES computation model using Tableau.
- 2) Forecast FTES data and faculty staffing requirements at the Faculty of Science, Chiang Mai University, for the academic years 2025–2029, categorized by program type, education level, and department.

INTRODUCTION

The Planning Division compiles full-time student (FTES) data annually to support the allocation of faculty positions to various departments. However, workforce planning requires forecasting the number of full-time students expected in the future to facilitate strategic faculty staffing. Therefore, the Planning Division has assigned students to develop a forecasting model for full-time students using Tableau. This model will project FTES and estimate faculty requirements for the academic years 2025–2029. The Planning Division will utilize the model and its analytical results for future planning and decision-making.

METHODOLOGY

RESULTS



1. Research and Collect Data.



2. Data Preparation and Cleaning



3. Practice the Calculation of FTES Data



4. Develop an FTES Calculation Model



5. Analyze and Forecast the Data



6. Compare Forecasting Errors and Select the Most Accurate Prediction



7. Conclusion

1 Results from the development of the FTES calculation model in Tableau.

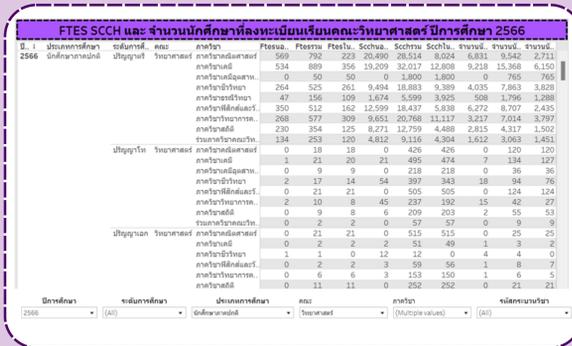


Figure 1: Example of FTES Calculation Model Results

2 FTES Forecasting and Faculty Staffing Calculations Results for Academic Years 2025–2029

Based on the comparison of the forecasting performance of FTES models using Mean Absolute Percentage Error (MAPE), Mean Absolute Deviation (MAD), and Mean Squared Deviation (MSD), which were developed using FTES data from the academic years 2014–2023, a total of five models were constructed: Moving Average, Double Exponential Smoothing, Exponential Growth Trend Model, Linear Trend Model, and Quadratic Trend Model.

- The FTES forecast results indicate an increasing trend across all departments, with the Department of Physics and Materials Science experiencing the highest increase in FTES, while the Department of Geology shows the lowest increase.
- The faculty staffing forecast results suggest an upward trend in all departments. The Department of Physics and Materials Science exhibits the highest increase in faculty positions, whereas the Department of Geology has the smallest increase compared to other departments.

Department	Staff Faculty Year 2025	Staff Faculty Year 2026	Staff Faculty Year 2027	Staff Faculty Year 2028	Staff Faculty Year 2029
Department of Mathematics	66	70	74	79	85
Department of Chemistry	55	56	58	59	63
Department of Industrial Chemistry	6	6	6	7	7
Department of Biology	40	42	43	45	46
Department of Geology	12	13	13	13	14
Department of Physics and Materials Science	44	48	52	57	63
Department of Computer Science	36	38	41	43	46
Department of Statistics	27	28	29	30	31

Table 1: Forecasted Faculty Staffing for the Years 2025-2029, Classified by Department

CONCLUSION

In conclusion, the number of full-time students across all departments within the Faculty of Science at Chiang Mai University exhibits an upward trend at all levels of education, particularly at the undergraduate and master's levels. As the number of full-time students increases each academic year, the faculty staffing requirements also rise accordingly. The departments with the most rapid growth in faculty positions over the past five years are the Department of Physics and Materials Science and the Department of Mathematics, both of which have seen an increase of 19 faculty members.

REFERENCE

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