

IE5202: Applied Forecasting Methods

Chen Nan

January 15, 2024

1 Module Outline

Lecture:	E3-06-05, 6:00-9:00pm, Monday (Blended)
Instructor:	Associate Professor Chen Nan, E1-05-20
Contact:	Phone: 65167914, Email: isecn@nus.edu.sg
Office Hours:	By appointment
Textbook:	<i>Forecasting, Time Series, and Regression</i> , by Bowerman, O'Connell, and Koehler
References:	<i>Linear Regression Analysis</i> , by George A. F. Seber, Alan J. Lee <i>Time Series Analysis</i> , by George E. P. Box, Gwilym M. Jenkins, Gregory C. Reinsel
Prerequisites:	IE5002, IE6002 or equivalent, programming
Grading:	Course Project: 70% Project 0: 10% Due Jan 28, 2024 Project 1: 30% Due Mar 01, 2024 Project 2: 30% Due Apr 21, 2024 In Class Quiz: 30% Quiz 1: 10% Feb 19, 2024 Quiz 2: 10% Mar 25, 2024 Quiz 3: 10% Apr 15, 2024
Course Description:	This module focuses on the theory and practice of forecasting methods. It discusses a few major categories of forecasting problems, and corresponding techniques. Extensive hands on projects will be provided to practice the skills in solving real life problems.
Important Dates:	Drop without penalty deadline Jan 28, 2024 Drop without "F" grade deadline Mar 03, 2024

2 Tentative Syllabus

Date	Topics	Remark
Jan 15, 2024	Module logistics, introduction, and reviews	Online Videos
Jan 22, 2024	Regression Analysis	
Jan 29, 2024	Interaction and Model Formulation	
Feb 05, 2024	Model checking and diagnosis	
Feb 12, 2024	<i>Public Holiday</i>	No class
Feb 19, 2024	Model Selection, Case studies	Quiz 1
Feb 24, 2024	<i>Recess Week</i>	No class
Mar 04, 2024	Computation and mixed effects model	Quiz 2
Mar 11, 2024	Seasonality, regression on time	
Mar 18, 2024	Exponential smoothing	
Mar 25, 2024	Autocorrelation and ARMA	
Apr 01, 2024	Seasonal ARIMA Model	Quiz 3
Apr 08, 2024	Neural networks for time series	
Apr 15, 2024	Forecasting spatial data	

3 Project Details

The projects are designed to assess your understandings of the theories and practice your skills in solving real problems. The dataset and background information of the project will be provided. For each project, the submission should include the following items

- A report not more than 10 pages with 1.5 spacing (soft copies), which documents the methods using, main findings, and interpretations. Codes and software printouts should NOT be included in the report. Useful graphs and tables should be included, to make the report self-contained (should not refer to your notebook or source codes).
- Complete codes used for the analysis, with reasonable details of comments (in Jupyter Notebook *.ipynb format)
- Forecasting results on the test dataset in a “csv” file.
- Please zip all your files, and name the submission file as STUDENTID.zip.

Your project is graded based on your methods, reports, and also the forecasting accuracies.