



ACE Network Subject Information Guide

Time Series

Semester 2, 2024

Administration and contact details

Host department	School of Mathematical and Physical Sciences
Host institution	Macquarie University
Name of lecturer	Nan Zou
Phone number	02 98508926
Email address	nan.zou@mq.edu.au
Homepage	https://sites.google.com/site/nzoupersonal/home
Name of honours coordinator	NA
Phone number	NA
Email address	NA
Name of masters coordinator	Nan Zou
Phone number	02 98508926
Email address	nan.zou@mq.edu.au

Subject details

Handbook entry URL	TBD
Subject homepage URL	TBD
Honours student hand-out URL	TBD
Teaching period (start and end date):	22 July 2024 - 3 Nov 2024
Exam period (start and end date):	4 Nov 2024 - 22 Nov 2024
Contact hours per week:	2
ACE enrolment closure date:	TBD
Lecture day(s) and time(s):	TBD
Description of electronic access arrangements for students (for example, LMS)	TBD

Subject content

1. Subject content description

In statisticians' ideal, all random elements are independent and identically distributed. However, in Time Series, the future and the past are usually not independent. To tackle and utilise this dependence, this unit introduces Time Series Analysis with an emphasis on Forecasting. Its first part gives some intuitions about the trend, seasonality and cycles of the time series and then uses these intuitions to forecast. Its second part tries to depict the dependence within time series with stochastic models, e.g., ARIMA and the state-of-the-art Neural Network, and then make forecasts based on these models.

2. Week-by-week topic overview

- 1 Introduction
- 2 Time series graphics
- 3 Time series decomposition
- 4 Time series features
- 5 The forecaster's toolbox
- 6 Time series regression models
- 7 Exponential smoothing
- 8 Exponential smoothing
- 9 ARIMA models
- 10 ARIMA models
- 11 ARIMA models
- 12 Dynamic Regression models
- 13 Neural Network

3. Assumed prerequisite knowledge and capabilities

Knowledge of probability distribution, expectation, conditional expectation, confidence interval, hypothesis testing and perhaps likelihood; familiarity with the R programming language.

4. Learning outcomes and objectives

- a. provide an understanding of common statistical methods used in forecasting
- b. develop computer skills for forecasting time series data
- c. provide insights into the problems of large scale forecasting systems

5. Learning resources



- Rob J Hyndman and George Athanasopoulos (2021) Forecasting: principles and practice, 3rd edition, OTexts: Melbourne, Australia.
- The online version of this book could be found at <https://otexts.com/fpp3/>

6. Assessment

Exam/assignment/classwork breakdown					
Exam	55%	Assignment	3*15% = 45%	Class work	0 %
Assignment due dates	Week 4	Week 8	Week 12		
Approximate exam date			4 Nov 2024 - 22 Nov 2024		

Institution honours program details – To Be Determined

Weight of subject in total honours assessment at host department	Click here to enter text.
Thesis/subject split at host department	Click here to enter text.
Honours grade ranges at host department	
H1	Enter range %
H2a	Enter range %
H2b	Enter range %
H3	Enter range %

Institution masters program details – To Be Determined

Weight of subject in total masters assessment at host department	Click here to enter text.
Thesis/subject split at host department	Click here to enter text.
Masters grade ranges at host department	
H1	Enter range %
H2a	Enter range %
H2b	Enter range %
H3	Enter range %