



STAT8122

Time Series

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Mathematical and Physical Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	2
<u>Assessment Tasks</u>	4
<u>Delivery and Resources</u>	6
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	7

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General Information

Unit convenor and teaching staff Unit Convenor/Lecturer Nan Zou nan.zou@mq.edu.au
Credit points 10
Prerequisites (Admission to MAppStat or MSc or MScInnovation or GradCertAppStat or GradDipAppStat or MActPrac) and (STAT6110 or STAT806 or STAT810 or STAT8310)) or (Admission to BMathScMAppStat and permission by special approval)
Corequisites
Co-badged status STAT7122
Unit description This unit is an introduction to Time Series Analysis and Forecasting. This unit introduces methods suitable for forecasting including the decomposition of time series, exponential smoothing methods, ARIMA modelling, and regression with autocorrelated disturbances.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

- ULO1:** provide an understanding of common statistical methods used in forecasting
- ULO2:** develop computer skills for forecasting time series data
- ULO3:** provide insights into the problems of implementing and operating large scale forecasting systems

General Assessment Information

General Assessment Information

In this unit, all assessments are individual-based and none of the assessments is "group work".

Assignment Submission

Assignment submission will be online through the iLearn page. Please read the submission statement carefully. You should upload your assignment as a single PDF file. No personalised cover sheet is required for online submissions. Please make sure that each page in your uploaded assignment corresponds to only one A4 page (do not upload an A3 page worth of content as an A4 page in landscape). If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free. It is your responsibility to make sure your assignment submission is legible. If there are technical obstructions to your submission online, please email us to let us know. You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make frequent submissions of your partially completed work as insurance against technical or other problems near the submission deadline.

Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session-based units with written assessments will have the following late penalty applied. Please see <https://students.mq.edu.au/study/assessment-exams/assessments> for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

Assessments where Late Submissions will be accepted

In this unit, late submissions will be accepted as follows:

- Assignment 1 – YES, Standard Late Penalty applies
- Assignment 2 – NO, unless Special Consideration is granted
- Assignment 3 – NO, unless Special Consideration is granted
- Final Exam – NO, unless Special Consideration is granted

Final Exam Policy

It is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only excuse for not sitting for an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances, you may apply for special consideration via

ask.mq.edu.au. If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during this supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Assignment 1</u>	15%	No	Week 4
<u>Assignment 2</u>	15%	No	Week 8
<u>Assignment 3</u>	15%	No	Week 12
<u>Final Examination</u>	55%	No	Formal Examination Period

Assignment 1

Assessment Type ¹: Quantitative analysis task

Indicative Time on Task ²: 10 hours

Due: **Week 4**

Weighting: **15%**

Reinforce and apply the concepts covered in lectures and the skills learned in SGTA sessions, through data analysis.

On successful completion you will be able to:

- provide an understanding of common statistical methods used in forecasting
- develop computer skills for forecasting time series data

Assignment 2

Assessment Type ¹: Quantitative analysis task

Indicative Time on Task ²: 10 hours

Due: **Week 8**

Weighting: **15%**

Reinforce and apply the concepts covered in lectures and the skills learned in SGTA sessions,

through data analysis.

On successful completion you will be able to:

- provide an understanding of common statistical methods used in forecasting
- develop computer skills for forecasting time series data
- provide insights into the problems of implementing and operating large scale forecasting systems

Assignment 3

Assessment Type ¹: Quantitative analysis task

Indicative Time on Task ²: 10 hours

Due: **Week 12**

Weighting: **15%**

Reinforce and apply the concepts covered in lectures and the skills learned in SGTA sessions, through data analysis.

On successful completion you will be able to:

- provide an understanding of common statistical methods used in forecasting
- develop computer skills for forecasting time series data
- provide insights into the problems of implementing and operating large scale forecasting systems

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Formal Examination Period**

Weighting: **55%**

An invigilated final examination to be scheduled in the university examination period.

On successful completion you will be able to:

- provide an understanding of common statistical methods used in forecasting
- develop computer skills for forecasting time series data

- provide insights into the problems of implementing and operating large scale forecasting systems

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Lectures and SGTAs

There is one two-hour synchronous lecture and one one-hour SGTAs each week. Lectures begin in Week 1 and SGTAs in Week 2. Please consult the timetable for the scheduling of these activities.

Technologies used and required

Lecture material will be placed on iLearn. R is used throughout the unit. R is free and is extensively used for performing statistical analysis.

Textbook

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/>

Unit Schedule

Week	Topic
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

Week	Topic
9	ARIMA models
10	ARIMA models
11	ARIMA models
12	Dynamic Regression models
13	Review

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and

courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#).

The policy applies to all who connect to the MQ network including students.