



# STAT826

## Market Research and Forecasting

S2 Day 2019

*Dept of Mathematics and Statistics*

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## General Information

Unit convenor and teaching staff

Unit Convenor & Lecturer

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Credit points

4

Prerequisites

Corequisites

((Admission to MAppStat or GradCertAppStat or GradDipAppStat or MSc) and STAT680) or (admission to MActPrac or MDataSc)

Co-badged status

Co-taught with STAT328 and co-badged with STAT726.

Unit description

Advanced quantitative methods including multivariate and other statistical methods that have important applications in market research will form the first part of this unit. Consumer choice modelling (conjoint analysis) will also be discussed. Methods for modelling and forecasting trends based on time series data, including techniques for seasonal adjustment will be covered. The unit will make extensive use of appropriate computer packages including SPSS.

## 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:

Be able to perform an appropriate principal components analysis (PCA) and interpret the results.

Be able to perform an appropriate Factor Analysis (FA) and interpret the results.

Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.

Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.

Be able to fit an appropriate ARIMA with regressors to data and interpret the results.

Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## General Assessment Information

**HURDLES:** This unit has no hurdle requirements. Your final grade is determined by adding the marks obtained for your examinations and assignments. Students should aim to get at least 60% for the course work in order to be reasonably confident of passing the unit.

**ASSIGNMENT SUBMISSION:** Assignment submission will be online through the iLearn page. Submit assignments online via the appropriate assignment link on the iLearn page. A personalised cover sheet is not required with online submissions. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

- Assignment submission is via iLearn. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments provided on the iLearn page.
- 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 submitting 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 SUBMISSION OF WORK:** All assignments or assessments must be submitted by, and class tests taken by the official due date and time. No marks will be given to late work unless an extension has been granted following a successful application for Special Consideration. Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assignment deadlines. It is in your interests to make frequent submissions of your partially completed work. Note that later submissions completely replace any earlier submission, and so only the final submission made before the due date will be marked.

**FINAL EXAM POLICY:** 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 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](http://ask.mq.edu.au).

### SUPPLEMENTARY EXAMINATIONS:

**IMPORTANT:** 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. If you apply for special consideration, you must give the supplementary examination priority over any other pre-existing commitments, as such commitments will not usually be considered an acceptable basis for a second application for special consideration. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (<https://bit.ly/FSESupp>) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Class Test 1</u></a>	15%	No	Week 6 Lecture
<a href="#"><u>Class Test 2</u></a>	15%	No	Week 12 Lecture
<a href="#"><u>Assignment</u></a>	10%	No	2 pm 25 October 2019
<a href="#"><u>Final Examination</u></a>	60%	No	Formal University Examination Period

### Class Test 1

Due: **Week 6 Lecture**

Weighting: **15%**

This will be held in the week 6 lecture. Permitted materials for the class test are a calculator, lecture notes, homework solutions, and practical solutions. There is no computer access during the class test. No electronic devices are allowed (e.g. iPhones, iPads, tablets, laptops, mobile phones) apart from nonprogrammable calculators.

Class Test 1 will be of 50 minutes duration.

On successful completion you will be able to:

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.

## Class Test 2

Due: **Week 12 Lecture**

Weighting: **15%**

This will be held in the week 12 lecture. Permitted materials for the class test are a calculator, lecture notes, assignments, assignment solutions, homework solutions, and practical solutions. There is no computer access during the class test. No electronic devices are allowed (e.g. iPhones, iPads, tablets, laptops, mobile phones) apart from non-programmable calculators.

Class Test 2 will be of 50 minutes duration.

On successful completion you will be able to:

- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## Assignment

Due: **2 pm 25 October 2019**

Weighting: **10%**

The assignment must be word processed and submitted in pdf format online via iLearn by 2pm on the due date. There is no "group work" assessment in this unit. All work is to be the student's own.

On successful completion you will be able to:

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.

## Final Examination

Due: **Formal University Examination Period**

Weighting: **60%**

The final exam is 2 hours long (with an additional 10 minutes reading time).

The final examination covers all course material. Students may take into the final examination ONE A4 page of notes handwritten (not typed) on BOTH sides.

On successful completion you will be able to:

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## Delivery and Resources

Every week there is one two hour lecture and one two hour practical in this unit. Lectures commence in Week 1 and Practicals in Week 2.

**Technologies used and required:** Lecture material will be placed on iLearn. The statistical package SPSS will be used and is available in ilab.

**Recommended Texts:** There is no set textbook for this unit. Useful reference texts for the Market Research part of this unit are

- Applied Multivariate Techniques by Subhash Sharma (QA278.S485/1996)
- Applied Multivariate Methods for Data Analysis by Dallas E. Johnson (QA278.J615/1998)
- Multivariate Statistical Methods by Bryan F. J. Manly (QA278.M35/2004)

There is no suitable text for Conjoint Analysis. Most treatments in Market Research textbooks are either too simple or too technical. A useful reference for the Forecasting part is

- Forecasting: Methods and Applications by Spyros Makridakis, Steven C. Wheelwright and Rob J. Hyndman (HD30.27.M34/1998)

## Unit Schedule

Week	Topic
1 (29 July)	Principal Component Analysis (PCA)
2 (5 August)	PCA
3 (12 August)	Factor Analysis (FA)
4 (19 August)	FA
5 (26 August)	Conjoint Analysis (CA)
6 (2 September)	Revision and <b>Class Test 1</b>

- 7 (9 September) Introduction to Forecasting
- 8 (30 September) ARIMA models
- 9 (8 October) ARIMA models
- 10 (14 October) Dynamic Regression models and intervention analysis
- 11 (21 October) Exponential smoothing and Periodicity.
- 12 (28 October) Revision and **Class Test 2**
- 13 (4 November) No lectures

Please note that the **Assignment is due 2 pm 25 October 2019 (Friday Week 11)**

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

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

### Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## Graduate Capabilities

### PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

### Learning outcomes

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.



- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## **Assessment tasks**

- Class Test 1
- Class Test 2
- Assignment
- Final Examination

## **PG - Discipline Knowledge and Skills**

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

## **Learning outcomes**

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## **Assessment tasks**

- Class Test 1
- Class Test 2
- Assignment
- Final Examination

## **PG - Critical, Analytical and Integrative Thinking**

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and

knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

### **Learning outcomes**

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

### **Assessment tasks**

- Class Test 1
- Class Test 2
- Assignment
- Final Examination

## **PG - Research and Problem Solving Capability**

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

### **Learning outcomes**

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## Assessment tasks

- Class Test 1
- Class Test 2
- Assignment
- Final Examination

## PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

## Learning outcomes

- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
- Be able to perform an appropriate Factor Analysis (FA) and interpret the results.
- Be able to perform a Conjoint Analysis (CA) and generate an orthogonal plan.
- Be able to fit an appropriate AR, MA or ARIMA time series model to data and interpret the results.
- Be able to fit an appropriate ARIMA with regressors to data and interpret the results.
- Be able to smooth data and fit an appropriate ARIMA to the smoothed data.

## Assessment tasks

- Class Test 1
- Class Test 2
- Assignment
- Final Examination

## Changes from Previous Offering

The number of assignments has been reduced from two to one and the two class tests are now worth 15% each instead of 10% each.