



# STAT826

## Market Research and Forecasting

S2 External 2017

*Dept of Statistics*

### Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Unit Schedule</u>	7
<u>Policies and Procedures</u>	8
<u>Graduate Capabilities</u>	9
<u>Changes since First Published</u>	13

#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit convenor and Lecturer

Thomas Fung

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Monday 2 - 4 pm

Lecturer

Balamehala Pasupathy

[balamehala.pasupathy@mq.edu.au](mailto:balamehala.pasupathy@mq.edu.au)

NA

Credit points

4

Prerequisites

Corequisites

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

Co-badged status

Co-badged with STAT726; Co-taught with STAT328

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 justify and carry out a principal components analysis (PCA); and interpret the results

Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.

Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.

Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.

Be able to combine a regression and an ARIMA in the same model; and interpret the results.

Be able to combine data smoothing and an ARIMA in the same model.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Assignment 1</u></a>	10%	No	1 September, 2017
<a href="#"><u>Assignment 2</u></a>	15%	No	27 October 2017
<a href="#"><u>Test 1</u></a>	10%	No	13 September 2017
<a href="#"><u>Test 2</u></a>	10%	No	8 November 2017
<a href="#"><u>Homework</u></a>	5%	No	Weeks 1-13
<a href="#"><u>Final Examination</u></a>	50%	No	TBA

## Assignment 1

Due: **1 September, 2017**

Weighting: **10%**

You will complete this assignment individually and submit it via *iLearn* by 12pm on the due date. You must submit the file in the PDF format. This can be done in Word or using freeware like Cute PDF Writer.

**No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved.**

On successful completion you will be able to:

- Be able to justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.

## Assignment 2

Due: **27 October 2017**

Weighting: **15%**

You will complete this assignment individually and submit it via *iLearn* by 12pm on the due date. You must submit the file in the PDF format. This can be done in Word or using freeware like Cute PDF Writer.

**No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved.**

On successful completion you will be able to:

- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

## Test 1

Due: **13 September 2017**

Weighting: **10%**

The test will be available on iLearn from 6pm till 11:59pm Australian Eastern Standard Time on the same day that the internal students do their test in class i.e. Monday 13 September. More details will be given at a later date.

**The only exception to sitting the mid-semester practical test at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Disruption to Studies. For more information, follow the links on the Policies and Procedures page.**

On successful completion you will be able to:

- Be able to justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.

## Test 2

Due: **8 November 2017**

Weighting: **10%**

The test will be available on iLearn from 6pm till 11:59pm Australian Eastern Standard Time on the same day that the internal students do their test in class i.e. Monday 8 November. More details will be given at a later date.

**The only exception to sitting the mid-semester practical test at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Disruption to Studies. For more information, follow the links on the Policies and Procedures page.**

On successful completion you will be able to:

- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

## Homework

Due: **Weeks 1-13**

Weighting: **5%**

Most weeks there will be set homework to submit through iLearn. Each homework should be submitted by 12pm on the Friday following the tutorial class if applicable.

**No extension will be granted. Student who have not submitted the solution to the homework prior to the deadline will be awarded a mark of 0 for the task, except for the cases in which an application of disruption to studies is made and approved.**

On successful completion you will be able to:

- Be able to justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the

results.

- Be able to combine data smoothing and an ARIMA in the same model.

## Final Examination

Due: **TBA**

Weighting: **50%**

The final Examination will be held during the end-of-year Examination period. The final Examination is 3 hours long (with an additional 10 minutes' reading time). It will cover all topics in the unit. The final examination is closed book. Students may take into the final Exam **ONE** A4 pages of notes **handwritten (not typed)** on **BOTH** sides. Students may take into the final Exam **ONE** A4 page of notes handwritten (not typed) on BOTH sides. Calculators will be needed but must not be of the text/programmable type.

The University Examination timetable will be available in Draft form approximately 8 weeks before the commencement of the examinations and in Final form approximately 4 weeks before the commencement of the examinations at: <http://www.timetables.mq.edu.au/exam>

The only exception to not sitting an examination on the designated date is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for disruption to studies.

If you notify the University of your disruption to studies for your final examination, you must make yourself available for the week of 11 December – 15 December, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

On successful completion you will be able to:

- Be able to justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

## Delivery and Resources

There are one two hour lecture and one two hour practical each week in this unit. Lectures and

Practicals commence in Week 1.

**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 (31 July)	Principal Components Analysis (PCA)
2 (7 August)	PCA
3 (14 August)	PCA and Factor Analysis (FA)
4 (21 August)	FA
5 (28 August)	Conjoint Analysis (CA)
6 (5 September)	CA and Revision
7 (11 September)	Class Test 1 & Introduction to Forecasting
8 (2 October)	Labour Day (No lecture)
9 (9 October)	Introduction to Forecasting (cont.) & ARIMA models
10 (16 October)	ARIMA models
11 (23 October)	Dynamic regression models and intervention analysis
12 (30 October)	Exponential Smoothing and Periodicity
13 (6 November)	Class Test 2

## Policies and Procedures

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

Academic Honesty Policy [http://mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](http://mq.edu.au/policy/docs/assessment/policy_2016.html)

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public [http://www.mq.edu.au/policy/docs/complaint\\_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy (in effect until Dec 4th, 2017): [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html)

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/student\\_conduct/](https://students.mq.edu.au/support/student_conduct/)

## Results

Results shown in *iLearn*, 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).

## 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)

## 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 justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

### Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Homework
- 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 justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

### Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Homework
- 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 justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and

discriminate between a FA and PCA.

- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

## **Assessment tasks**

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Homework
- 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 justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

## **Assessment tasks**

- Assignment 1
- Assignment 2

- Test 1
- Test 2
- Homework
- 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 justify and carry out a principal components analysis (PCA); and interpret the results
- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
- Be able to combine a regression and an ARIMA in the same model; and interpret the results.
- Be able to combine data smoothing and an ARIMA in the same model.

### Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Homework
- Final Examination

## PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

## Learning outcomes

- Be able to justify and carry out a factor analysis (FA); interpret the results; and discriminate between a FA and PCA.
- Be able to explain a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.

## Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Homework
- Final Examination

## Changes since First Published

Date	Description
27/07/2017	Updated the due date for some assessment tasks.