STAT328

Market Research and Forecasting

S2 Day 2017

Dept of Statistics

Contents

General Information

Unit convenor and teaching staff
Unit convenor and Lecturer
Thomas Fung
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12 Wally's Walk (E7A) Office 6.26
Monday 2 - 4 pm

Lecturer
Balamehala Pasupathy
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NA

Credit points
3

Prerequisites
6cp at 200 level including (STAT270 or STAT271 or BIOL235(P) or PSY222 or PSY248(P))

Corequisites

Co-badged status
Co-taught with STAT826 and STAT726

Unit description
Advanced quantitative methods including conjoint analysis, principal component analysis and other statistical techniques that have important applications in market research form the first part of this unit. Emphasis is placed on market research applications. The unit then covers methods for modelling and forecasting trends based on time series data, including procedures for seasonal adjustment.

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

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

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

Be able to identity 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
Assignment 1	5%	No	1 September, 2017
Assignment 2	10%	No	27 October 2017
Test 1	10%	No	13 September 2017
Test 2	10%	No	8 November 2017
HW & Tutorial Participation	5%	No	Weeks 1-13
Final Examination	60%	No	TBA

Assignment 1

Due: **1 September, 2017**
Weighting: **5%**

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

• Be able to carry out a factor analysis (FA); and interpret the results.

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

Assignment 2

Due: **27 October 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 identity 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%**

In the Week 7 lecture you will sit a 50-minute test. The test will be conducted under exam conditions, that is, silently and with no communication between students. You may, however, bring in your calculator, lecture notes, assignments, assignment solutions, homework solutions and tutorial solutions with you. No textbooks and no computer access (including iPads, iPods, tablets, laptops, smart phones and so forth).

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

Test 2

Due: **8 November 2017**
Weighting: **10%**

In the Week 13 lecture you will sit a 50-minute test. The test will be conducted under exam conditions, that is, silently and with no communication between students. You may, however, bring in your calculator, lecture notes, assignments, assignment solutions, homework solutions and tutorial solutions with you. No textbooks and no computer access (including iPads, iPods,

tablets, laptops, smart phones and so forth).

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 identity 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.

HW & Tutorial Participation

Due: **Weeks 1-13**
Weighting: **5%**

Every week tutorial participation will be monitored and 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 carry out a principal components analysis (PCA); and interpret the results
- Be able to carry out a factor analysis (FA); and interpret the results.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to identity 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: **60%**

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

Assessment Policy 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.a

u/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

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/

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.

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) 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

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.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Be able to carry out a principal components analysis (PCA); and interpret the results
- Be able to carry out a factor analysis (FA); and interpret the results.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to identity 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
- HW & Tutorial Participation
- Final Examination

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Be able to carry out a principal components analysis (PCA); and interpret the results
- Be able to carry out a factor analysis (FA); and interpret the results.

- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to identity a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
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- Assignment 2
- Test 1
- Test 2
- HW & Tutorial Participation
- Final Examination

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

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

- Assignment 1
- Assignment 2

- Test 1

- Test 2

- HW & Tutorial Participation

- Final Examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Be able to carry out a principal components analysis (PCA); and interpret the results

- Be able to carry out a factor analysis (FA); and interpret the results.

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

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

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Assessment tasks

- Assignment 1

- Assignment 2

- Test 1

- Test 2

- HW & Tutorial Participation

- Final Examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Be able to carry out a principal components analysis (PCA); and interpret the results
- Be able to carry out a factor analysis (FA); and interpret the results.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to identity a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
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Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- HW & Tutorial Participation
- Final Examination

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Be able to carry out a principal components analysis (PCA); and interpret the results
- Be able to carry out a factor analysis (FA); and interpret the results.
- Be able to carry out a conjoint analysis (CA) and generate an orthogonal plan.
- Be able to identity a time series model; fit some common time series models such as AR, MA and ARIMA and select the appropriate model.
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Assessment tasks

- Assignment 1

- Assignment 2
- Test 1
- Test 2
- HW & Tutorial Participation
- Final Examination

Changes since First Published

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