STAT328

Market Research and Forecasting

S2 Day 2018

Dept of Statistics

Contents

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General Information

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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 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

In the case of a late submission for an assignment, if no special consideration has been granted, 10% of the earned mark will be deducted for each day that an assignment is late, up to a maximum of 50%. After 5 days, counted including weekends and public holidays, a mark of 0% will be awarded. NOTE: It is not the intention of this late penalty policy to cause a student to fail the unit when they have submitted their assignment no more than 5 days after the due date and they would have otherwise passed. In this case, if deductions for late assignments result in the final unit mark for a student being less than 50 out of 100, when otherwise it would have been 50 out of 100 or greater, the student's final mark will be exactly 50 out of 100.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	5%	No	31/8/2018
Assignment 2	10%	No	26/10/2018
Class Test 1	10%	No	Week 6 Lecture
Class Test 2	10%	No	Week 12 Lecture
HW and Tutorial Participation	5%	No	Weekly
Final Examination	60%	No	TBA

Assignment 1

Due: **31/8/2018**
Weighting: **5%**

Assignment 1 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.

Please refer to **General Assessment Information** for lateness penalty.

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.

Assignment 2

Due: **26/10/2018**
Weighting: **10%**

Assignment 1 must be submitted in **pdf format online via iLearn** by 2pm on the due date. This can be done in Word. There is no "group work" assessment in this unit. All work is to be the student's own.

Please refer to **General Assessment Information** for lateness penalty.

On successful completion you will be able to:

- 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.

Class Test 1

Due: **Week 6 Lecture**
Weighting: **10%**

This will be held in the week 6 lecture.

Permitted materials for the class test are a calculator, lecture notes, assignments, assignment solutions, homework solutions, and tutorial 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.

Failure to attend the test without relevant documentation to explain the absence (submitted as a Special Consideration request within 5 working days of the test) will result in zero marks being awarded for the test.

The procedure for submitting a Special Consideration online can be obtained by visiting ask.mq.edu.au.

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: **10%**

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 tutorial 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.

Failure to attend the test without relevant documentation to explain the absence (submitted as a Special Consideration request within 5 working days of the test) will result in zero marks being awarded for the test.

The procedure for submitting a Special Consideration online can be obtained by visiting ask.mq.edu.au.

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.

HW and Tutorial Participation

Due: **Weekly**
Weighting: **5%**

Every week tutorial participation will be monitored and most weeks there will be set homework to submit on iLearn.

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.

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. 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.

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 special consideration.

If your special consideration for your final examination is approved, you must make yourself available for the week of 17 December – 21 December, 2018. 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.until the end of the teaching semester, that is, the final day of the official examination period.

It is Macquarie University policy to not set early examinations for individuals or groups of students. All students are expected to ensure that they are available

On successful completion you will be able to:
- Be able to perform an appropriate principal components analysis (PCA) and interpret the results.
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- 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 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 (30 July)	Principal Component Analysis (PCA)
2 (6 August)	PCA
3 (13 August)	Factor Analysis (FA)
4 (20 August)	FA
5 (27 August)	Conjoint Analysis (CA)
6 (3 September)	Revision and Class Test 1
7 (10 September)	Introduction to Forecasting
8 (2 October)	ARIMA models
9 (8 October)	ARIMA models
10 (15 October)	Dynamic Regression models and intervention analysis
11 (22 October)	Exponential smoothing and Periodicity
12 (29 October)	Revision and Class Test 2
13 (5 November)	Revision

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). 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). 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).

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 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 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

- Assignment 1
- Assignment 2
- Class Test 1
- Class Test 2
- HW and 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 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.
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- Final Examination

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Assessment task

- HW and Tutorial Participation

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 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.
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Assessment tasks

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- Assignment 2
- Class Test 1
- Class Test 2
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- 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 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.

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Assessment tasks

- Assignment 1

- Assignment 2

- Class Test 1

- Class Test 2

- HW and 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 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.

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Assessment tasks

- Assignment 1

- Assignment 2

- Class Test 1

- Class Test 2

- HW and 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 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.
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Assessment tasks

- Assignment 1
- Assignment 2
- Class Test 1
- Class Test 2
- HW and Tutorial Participation
- Final Examination