STAT3102

Graphics, Multivariate Methods and Data Mining

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

School of Mathematical and Physical Sciences

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General Information

Unit convenor and teaching staff
Unit Convenor/Lecturer
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Please refer to iLearn

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Credit points
10

Prerequisites
20cp at 2000 level including ((STAT270 or STAT2170) or (STAT271 or STAT2371) or (BIOL235(P) or BIOL2610) or (PSY222 or (PSY248(P) or PSYU2248))

Corequisites

Co-badged status

Unit description
This unit introduces statistical tools for multivariate data analysis such as statistical graphics, discriminant analysis, principal component analysis, cluster analysis and an introduction to data mining, especially classification. Statistical packages are used extensively to illustrate the concepts.

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: Interpret and apply principles underlying statistical data visualisation, multivariate methods and data mining to problems arising from diverse fields of research.

ULO2: Choose appropriate graphical techniques for displaying data.

ULO3: Choose the appropriate statistical analysis, for a given data set, from a wide range ofmethods based on multivariate methods and data mining.

ULO4: Use a statistical computer package to carry out chosen analyses and interpret the results; present the results of analyses in a form which is suitable for technical report or publication.

General Assessment Information

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.

Late Submissions in this unit:

- SGTA Works – **YES** (the late penalty applies)
- Mid-Semester Test – **NO** (unless Special Consideration is granted to sit supplementary Mid-Semester Test)
- Practical Test– **NO** (unless Special Consideration is granted to sit supplementary Practical Test)

Assessment Tasks

Name	Weighting	Hurdle	Due
SGTA Works	10%	No	Week 3, 5, 7, 10
Mid-Semester Test	30%	No	Week 8
Practical Test	60%	No	Week 12

SGTA Works

Assessment Type [1]: Qualitative analysis task
Indicative Time on Task [2]: 40 hours
Due: **Week 3, 5, 7, 10**
Weighting: **10%**

The tasks given during four SGTA computer lab sessions are to be completed within the

allocated time and submitted via iLearn. The four SGTA Works are worth 10% in total.

On successful completion you will be able to:

- Choose appropriate graphical techniques for displaying data.
- Choose the appropriate statistical analysis, for a given data set, from a wide range ofmethods based on multivariate methods and data mining.
- Use a statistical computer package to carry out chosen analyses and interpret the results; present the results of analyses in a form which is suitable for technical report or publication.

Mid-Semester Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 1 hours
Due: **Week 8**
Weighting: **30%**

Further information will be provided in the iLearn site of the unit.

On successful completion you will be able to:

- Interpret and apply principles underlying statistical data visualisation, multivariate methods and data mining to problems arising from diverse fields of research.
- Choose appropriate graphical techniques for displaying data.
- Choose the appropriate statistical analysis, for a given data set, from a wide range ofmethods based on multivariate methods and data mining.

Practical Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Week 12**
Weighting: **60%**

This is an open book style timed online exam. The practical test is designed to examine the use of software for data analysis and the software output interpretation skills taught in the unit. Further information will be provided in the iLearn site of the unit.

On successful completion you will be able to:

- Interpret and apply principles underlying statistical data visualisation, multivariate methods and data mining to problems arising from diverse fields of research.
- Choose appropriate graphical techniques for displaying data.
- Choose the appropriate statistical analysis, for a given data set, from a wide range ofmethods based on multivariate methods and data mining.
- Use a statistical computer package to carry out chosen analyses and interpret the results; present the results of analyses in a form which is suitable for technical report or publication.

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[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

Software: SPSS and R

The recommended references are

Chambers J M et al (1983) Graphical Methods for Data Analysis;

Cleveland W S (1994) Elements of Graphing Data;

Tufte E R (2001) The Visual Display of Quantitative Information;

Everitt B S et al (2001) Applied multivariate data analysis;

Johnson, R.A. & Wichern, D.W. (2002) Applied Multivariate Statistical Analysis;

Manly, B F J (2004) Multivariate Statistical Methods - A Primer.

Unit Schedule

Week	Topic	Due
	Introduction	

Week	Topic	Due
	Different graphical displays	
	Displaying multivariate data	SGTA Work
	Similarities and distances	
	Hierarchical cluster analysis	SGTA Work
	K-means clustering	
	Eigenvalues and eigenvectors	SGTA Work
	Principal component analysis	Mid-Semester Test
	Principal component analysis cont.	
	Discriminant analysis	SGTA Work
	Classification Trees Revision	
	Final assessment:	Practical Test

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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). 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) 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.