



# STAT3102

## Graphics, Multivariate Methods and Data Mining

Session 2, Special circumstance 2020

*Department of Mathematics and Statistics*

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#### Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

Unit convenor and teaching staff

Unit Convenor/Lecturer

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TBA

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

STAT6102

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 of methods 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

See iLearn

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>SGTA Works</u>	10%	No	Weeks 3, 5, 7 and 10
<u>Mid-Semester Test</u>	30%	No	Week 8
<u>Practical Test</u>	60%	No	Week 12

### SGTA Works

Assessment Type <sup>1</sup>: Qualitative analysis task

Indicative Time on Task <sup>2</sup>: 40 hours

Due: **Weeks 3, 5, 7 and 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 of methods 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 <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 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 of methods based on multivariate methods and data mining.

## Practical Test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 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 of methods 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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<sup>1</sup> 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.

<sup>2</sup> 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

There are no prescribed texts for this unit, but the following list provides useful references.

### Recommended texts:

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	TOPICS	WORK DUE
1	Introduction	
2	Different graphical displays	
3	Displaying multivariate data	SGTA Work
4	Similarities and distances	
5	Hierarchical cluster analysis	SGTA Work
6	K-means clustering	
7	Eigenvalues and eigenvectors	SGTA Work

8	Principal component analysis	Mid-Semester Test
9	Principal component analysis cont.	
10	Discriminant analysis	SGTA Work
11	Classification Trees Revision	
12	Final assessment	Practical Test

## 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.*)

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](mailto: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 help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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

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](mailto: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.