# STAT3102

## Graphics, Multivariate Methods and Data Mining

Session 2, Special circumstances 2021

*Department of Mathematics and Statistics*

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**Notice**

Some on-campus classes have moved online for the first two weeks of Session, before returning to campus in Week 3. If you are studying a unit outside of the primary Session 2 timetable, please contact your teaching staff team for further details.

Some classes/teaching activities cannot be moved online and must be taught on campus. To find out if you are enrolled in one of these classes/teaching activities, you can check to see if your unit is on the list of units with mandatory on-campus classes/teaching activities.*

Your Unit Convenor will provide more information via an iLearn announcement when your iLearn unit becomes available.
General Information

Unit convenor and teaching staff
Unit Convenor/Lecturer
Nino Kordzakhia
nino.kordzakhia@mq.edu.au
Contact via E-mail
Please refer to iLearn

Lecturer
Benoit Liquet-Weiland
benoit.liquet-weiland@mq.edu.au
Contact via Email
Please refer to iLearn

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benoit.liquet-weiland@mq.edu.au

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://students.mq.edu.au/important-dates

Learning Outcomes
On successful completion of this unit, you will be able to:
Unit guide | STAT3102 Graphics, Multivariate Methods and Data Mining

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

WORK SUBMISSION: The submission link will be available on the iLearn site of the Unit.

LATE SUBMISSION OF WORK: All assessment tasks must be submitted by the official due date and time. In the case of late submission for a non-timed assessment (e.g. SGTA work), if special consideration has NOT been granted, 20% of the earned mark will be deducted for each 24-hour period (or part thereof) that the submission is late for the first 2 days (including weekends and/or public holidays). For example, if an assignment is submitted 25 hours late, its mark will attract a penalty equal to 40% of the earned mark. After 2 days (including weekends and public holidays) a mark of 0% will be awarded. Timed assessment tasks (e.g. tests) do not fall under these rules.

Assessment Tasks

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

SGTA Works

Assessment Type 1: Qualitative analysis task
Indicative Time on Task 2: 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: Quiz/Test

Indicative Time on Task: 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: Quiz/Test

Indicative Time on Task: 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.

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 Learning Skills Unit 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

Cleveland W S (1994) Elements of Graphing Data;

Unit Schedule

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
<th>Due</th>
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<tr>
<td></td>
<td>Introduction</td>
<td></td>
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<tr>
<td></td>
<td>Different graphical displays</td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
<td>Due</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>3</td>
<td>Displaying multivariate data</td>
<td>SGTA Work</td>
</tr>
<tr>
<td>4</td>
<td>Similarities and distances</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hierarchical cluster analysis</td>
<td>SGTA Work</td>
</tr>
<tr>
<td>6</td>
<td>K-means clustering</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Eigenvalues and eigenvectors</td>
<td>SGTA Work</td>
</tr>
<tr>
<td>8</td>
<td>Principal component analysis</td>
<td>Mid-Semester Test</td>
</tr>
<tr>
<td>9</td>
<td>Principal component analysis cont.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Discriminant analysis</td>
<td>SGTA Work</td>
</tr>
<tr>
<td>11</td>
<td>Classification Trees Revision</td>
<td></td>
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<tr>
<td>12</td>
<td>Final assessment:</td>
<td>Practical Test</td>
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### 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.)*
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/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

**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 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 Enquiry Service**

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

**Equity 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.
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.