



STAT723

Statistical Graphics

S1 Day 2014

Statistics

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General Information

Unit convenor and teaching staff

Unit Convenor

Peter Petocz

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Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

Stat723 is co-badged with Stat823

Unit description

We present the principles of effective graphical presentation, set them in a historical context and apply them to a variety of statistical data sets. Emphasis is given to use of modern multivariate graphical techniques such as trellis/lattice graphs and mosaic plots to show a variety of displays of data and model fits, and to display model consistency with data. To present graphics, we introduce and use S-Plus and R software, as well as other standard packages. Participants choose an area for further investigation related to their interests.

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:

1. be familiar with important historical and contemporary examples of graphics, and be able to use them as models in their own work
2. be aware of the elements of graphical design, and use them to critically appraise presented graphics in articles and web pages and suggest appropriate ways of improving them
3. be familiar with a range of modern multivariate graphical techniques and know when it is appropriate to use them

4. be able to use the computer to generate appropriate graphics using particular packages or languages and be able to develop the ability to do so in others
5. use statistical graphics to investigate and analyse data, check statistical model assumptions and effectively present the results of statistical investigations to a range of audiences
6. be aware of the ethical aspects associated with the use of statistical graphics in society

Assessment Tasks

Name	Weighting	Due
Portfolio	25%	Monday 9 May
Project	40%	Monday 9 June
Take-home exam	35%	Saturday 14 June

Portfolio

Due: **Monday 9 May**

Weighting: **25%**

An individual portfolio of five items relating to statistical graphics, each item using a maximum of two pages, on topics or questions presented in classes (and on the website). You will be asked to submit these online, and they will be graded on a scale of 1-5 each.

On successful completion you will be able to:

- 1. be familiar with important historical and contemporary examples of graphics, and be able to use them as models in their own work
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- 3. be familiar with a range of modern multivariate graphical techniques and know when it is appropriate to use them
- 4. be able to use the computer to generate appropriate graphics using particular packages or languages and be able to develop the ability to do so in others
- 5. use statistical graphics to investigate and analyse data, check statistical model assumptions and effectively present the results of statistical investigations to a range of audiences

- 6. be aware of the ethical aspects associated with the use of statistical graphics in society

Project

Due: **Monday 9 June**

Weighting: **40%**

A (solo or paired) project in a selected area of interest, including (individual) presentation (15%) and a written summary (25%). The presentations will be made during class in week 12 (Thursday 5 June) and the written summary is due by Monday 9 June.

On successful completion you will be able to:

- 1. be familiar with important historical and contemporary examples of graphics, and be able to use them as models in their own work
- 2. be aware of the elements of graphical design, and use them to critically appraise presented graphics in articles and web pages and suggest appropriate ways of improving them
- 3. be familiar with a range of modern multivariate graphical techniques and know when it is appropriate to use them
- 4. be able to use the computer to generate appropriate graphics using particular packages or languages and be able to develop the ability to do so in others
- 5. use statistical graphics to investigate and analyse data, check statistical model assumptions and effectively present the results of statistical investigations to a range of audiences
- 6. be aware of the ethical aspects associated with the use of statistical graphics in society

Take-home exam

Due: **Saturday 14 June**

Weighting: **35%**

You will be given an individual take-home examination during the last week of semester (available on the morning of Saturday 7 June, due by the evening of Saturday 14 June). This will be in the form of a consulting problem requiring data analysis and preparation of a report including presentation graphics, requiring about 3-6 hours work.

On successful completion you will be able to:

- 2. be aware of the elements of graphical design, and use them to critically appraise presented graphics in articles and web pages and suggest appropriate ways of improving them
- 3. be familiar with a range of modern multivariate graphical techniques and know when it is appropriate to use them
- 4. be able to use the computer to generate appropriate graphics using particular packages or languages and be able to develop the ability to do so in others
- 5. use statistical graphics to investigate and analyse data, check statistical model assumptions and effectively present the results of statistical investigations to a range of audiences
- 6. be aware of the ethical aspects associated with the use of statistical graphics in society

Delivery and Resources

You will have one 2-hour lecture class on **Thursday 9-11** in **E4B-G214** and one 1-hour practical class **Thursday 11-12** or **12-1** in **E4B-102** (the second of these options will only be used if the class is large enough). If possible, you should attend these classes; but if you are enrolled externally there will be options for participation: materials on iLearn, recorded sessions and conferencing software.

There is no specified textbook for this unit and a variety of readings will be made available internet. The following books are good general references that will be used during the semester:

- Tufté, E. (2001). *The Visual Display of Quantitative Information* (second edition). Graphics Press, Cheshire Conn. (2001). Also *Envisioning Information* (1990), *Visual Explanations* (1997), *Beautiful Evidence* (2006) by the same author.
- Cleveland, W. (1993). *Visualizing Data*. Hobart Press, New Jersey.
- Chen, C., Hardle, W. and Unwin, E. (eds.) (2008). *Handbook of Data Visualization*. [HDV] Springer-Verlag, Berlin. (Available in the library as an electronic resource.)

With the relatively number of students enrolled and the advanced (masters) level of this unit, we will be relying less on formal lectures and more on individual reading, preparation and learning to use the computer, and on collaborative investigation and discussion of problems. However, we will have a number of 'guest lectures' which will be presented live and be available in some electronic form afterwards. There will be weekly readings (usually electronic), weekly data investigations (using a computer package or language), weekly discussions (live or electronic) and regular opportunities to create and add materials to your portfolio. Live class discussions will be recorded and the recording placed on the iLearn site soon after.

Technologies Used: The unit will make use of a range of packages, most importantly R, and the graphing packages Mondrian and GGobi.

What has changed from previous years: In previous years we made use of the package SPlus, but this year we will replace the emphasis on this by using R (though SPlus may also be used to a smaller extent).

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.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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/

Late Assessment Tasks No extensions will be granted for any assessment tasks. 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 you have made an application for special consideration and this has been approved by the lecturer.

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://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.