STAT399

Consulting in Statistical Sciences

S2 Day 2019

Dept of Mathematics and Statistics

Contents

General Information

Unit convenor and teaching staff
Frank Schoenig
frank.schoenig@mq.edu.au

Ayse Bilgin
ayse.bilgin@mq.edu.au

Credit points
3

Prerequisites
6cp in STAT units at 300 level including (STAT375 or STAT379)

Corequisites

Co-badged status

Unit description
This unit integrates the core concepts in statistics and decision science in the practical context of solving real research problems by the application of technical ideas and methods. In particular, the unit aims to give students exposure to the general and discipline-specific issues that arise in statistical and decision science work, and to provide an experiential background in consulting. Students will develop the ability to appreciate the nature of statistical and decision science problems and discuss the problem-solving cycle: listen to a client's statement of a problem and ask appropriate questions for clarification; recognise appropriate technical techniques for use in a variety of problems, and apply these techniques competently; recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques; write reports at an appropriate technical level for a client or a colleague; give an oral summary of a statistical or decision science investigation at a level appropriate for the audience; and discuss the ethical aspects and implications of professional data work.

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:

Identify and apply appropriate statistical techniques for authentic client projects

Enhance critical thinking skills through self reflection and peer assessment

Ask appropriate questions to identify a statistical problem

Improve ability to work co-operatively as a team member

Write reports at an appropriate statistical level for a client or a colleague

Give a verbal summary of a statistical investigation at a level appropriate for the audience

Discuss the ethical aspects and implications of professional statistical work

Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

General Assessment Information

ATTENDANCE and PARTICIPATION: Please contact the unit convenor as soon as possible if you have difficulty attending and participating in any classes. If there are circumstances that mean you miss a class, you can apply for a Special Consideration via ask.mq.edu.au.

LATE SUBMISSION OF WORK: All assignments and assessment tasks must be submitted by the official due date and time. No marks will be given for late work unless an extension has been granted following a successful application for Special Consideration. Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assignment deadlines.

Assessment Tasks

Name	Weighting	Hurdle	Due
Project Plan	10%	No	Week 7
Project Report	50%	No	Week 11
Project Presentation	30%	No	Weeks 11 - 12
Reflection	0%	Yes	Week 12
Participation	10%	No	Weekly

Project Plan

Due: **Week 7**
Weighting: **10%**

Submit assignments online via the appropriate assignment link. A personalised coversheet is not required with online submission. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

Submit and access feedback from an iLearn assignment:

- Assignment submission is via iLearn. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments.
- Please make sure that each page in your uploaded assignment corresponds to only one A4 page

  (do not upload an A3 page worth of content as an A4 page in landscape).

  If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free.
- It is your responsibility to make sure your assignment submission is legible.
- If there are technical obstructions to your submitting online, please email us to let us know.

You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make frequent submissions of your partially completed work as insurance against technical or other problems near the submission deadline.

Late Submission of Work

All assignments must be submitted by the official due date and time. No marks will be given to late work unless an extension has been granted following a successful application for Special Consideration. Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assignment deadlines.

On successful completion you will be able to:

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Discuss the ethical aspects and implications of professional statistical work

Project Report

Due: **Week 11**
Weighting: **50%**

Project Report (written) including Memos/Minutes of Group Meetings (with or without client).

Submit assignments online via the appropriate assignment link. A personalised coversheet is not required with online submission. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

Submit and access feedback from an iLearn assignment:

- Assignment submission is via iLearn. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments.
- Please make sure that each page in your uploaded assignment corresponds to only one A4 page

  (do not upload an A3 page worth of content as an A4 page in landscape).

  If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free.
- It is your responsibility to make sure your assignment submission is legible.
- If there are technical obstructions to your submitting online, please email us to let us know.

You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make frequent submissions of your partially completed work as insurance against technical or other problems near the submission deadline.

Late Submission of Work

All assignments must be submitted by the official due date and time. No marks will be given to late work unless an extension has been granted following a successful application for Special Consideration. Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assignment deadlines.

On successful completion you will be able to:

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work
- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Project Presentation

Due: **Weeks 11 - 12**

Weighting: **30%**

One aspect of the project will be presented by each group member (individually)

On successful completion you will be able to:

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work
- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Reflection

Due: **Week 12**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Warning: this is a hurdle assessment. To pass the unit, students need to send their "Self Reflection" on Group Process, technical aspects of the group project and statistical consulting experience.

On successful completion you will be able to:

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Discuss the ethical aspects and implications of professional statistical work
- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Participation

Due: **Weekly**
Weighting: **10%**

Participation in Lectures and SGTAs: engaging in class discussions and exercises proactively

On successful completion you will be able to:

- Identify and apply appropriate statistical techniques for authentic client projects
- Ask appropriate questions to identify a statistical problem
- Write reports at an appropriate statistical level for a client or a colleague
- Discuss the ethical aspects and implications of professional statistical work

Delivery and Resources

Classes

You should attend 2 hours of lectures and 2 hours of SGTAs each week. SGTA classes begin in Week 2.

Required and Recommended Texts and/or Materials

Note that some of the following will be provided to students during semester.

Boen J & Zahn D, The Human Side of Statistical Consulting, Lifetime Learning Pubs, Belmont CA, 1982. (Not available in library)

Boomer K, Rogness N & Jersky B, Statistical consulting courses for undergraduates: fortune or folly, JSE, 15(3), 2007. (Electronic version QA276.18)

Chatfield C, Problem Solving: A Statistician's Guide, 2nd ed., Chapman and Hall, London, 1995. (QA276.12 .C457 1995)

Derr J, Statistical Consulting: A Guide to Effective Communication, Duxbury 2000. (HA29 .D386/ 2000)

Finch S & Gordon I, Lessons we have learned from post-graduate students, ICOTS8, 2010.

Hand DJ and Everitt BS (eds.), The Statistical Consultant in Action, Cambridge Uni Press, 1987. (Sections 1, 2 and 4 are available in Google.books)

Mackisack M & Petocz P, Projects for advanced undergraduates, ICOTS6, 2002.

McGinn M, Learning to use statistics in research: a case study of learning in a university-based statistical consulting centre, SERJ, 2010.

Peter Petocz, Anna Reid (2010) On Becoming a Statistician - A Qualitative View. International Statistical Review. 78(2): 271-286.

Rothman E, Teaching students and staff consultancy skills, ICOTS7, 2006.

Smith H & Walker J, Experiences with research teams comprised of graduate students, faculty researchers and a statistical consulting team, ICOTS8, 2010.

Wild C & Pfannkuch M, Statistical thinking in empirical enquiry, International Statistical Review, 67(3), 1-12.

ICOTS, SERJ and International Stat Review papers are available at http://www.stat.auckland.ac.nz/~iase/publications.php

International Statistical Institute http://www.isi-web.org/

The Statistical Society of Australia http://www.statsoc.org.au/

American Statistical Association http://www.amstat.org/

Statistical Society of Canada http://www.ssc.ca/en/whats-new

EURO (The Association of European Operational Research Societies) website: https://www.euro-online.org/web/pages/1/home

Australian Society for Operations Research http://www.asor.org.au/

INFORMS (The Institute for Operations Research and the Management Sciences) website: https://www.informs.org/

Technologies used and required

We will use iLearn for distribution of course notes, readings, data sets, solutions, announcements and discussions. We would like you to use the 'Discussions' to communicate with other students and the lecturers to enable transparency between all the students and the lecturers. You can access the unit iLearn site from http://ilearn.mq.edu.au using your Student ID number and myMQ Portal password. If you have any problems go to the http://www.mq.edu.au/iLearn/student_info/

If you have a personal question, please send an e-mail to one of the lecturers through the iLearn e-mail facility (called dialogue) or alternatively a regular e-mail using your Macquarie University student e-mail account.

The lecturers will make announcements via iLearn. Accordingly, you should make sure you log in and read the posts at least twice a week. You might consider subscribing to iLearn posts this way you will not miss any posts.

Teaching and Learning Strategy

- Students are expected to attend all the lectures and the SGTAs. SGTA classes begin from week 2.
- Readings will be provided through iLearn.
- Weekly SGTAs are designed for students to work together in groups and to gain feedback.

- Assessments are designed to enhance self reflection and peer assessment as well as providing individual learning if a real life problem requires an unknown statistical technique to be used for a proper solution to the problem at hand.

Unit Schedule

WEEK	TOPIC
(1)	Introduction to PACE Units Introduction to consulting in statistical sciences Literature review
(2)	Asking the right questions (oral communication skills) Effective Research Techniques (M4.03 in the Library 11-12 pm)
(3)	Data preparation for analysis Statistical graphics
(4)	Writing a statistical report (written communication skills) Working in a group (skills required for effective group work)
(5)	Human side of statistical consulting (Guest lecture)
(6)	Project Planning
(7)	Ethics and Statistics Statistical thinking
	Mid semester break (two weeks)
(8)	Project Work
(9)	Project Work
(10)	Project Work
(11)	Presentations of final projects
(12)	Presentations of final projects
(13)	No lecture

The order of the lectures might change, as some classes depend on the availability of clients and guest lecturers.

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 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 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

If you are a Global MBA student contact 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/.

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

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work
- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Assessment tasks

- Project Plan

- Project Report
- Project Presentation
- Reflection

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

- Identify and apply appropriate statistical techniques for authentic client projects
- Ask appropriate questions to identify a statistical problem
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Assessment tasks

- Project Report
- Project Presentation
- Reflection

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:

Learning outcomes

- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience

- Recognise situations in which familiar techniques do not apply and search the literature for appropriate alternative techniques

Assessment tasks

- Project Report
- Project Presentation
- Reflection

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

- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience

Assessment tasks

- Project Plan
- Project Report
- Project Presentation
- Participation

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

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work

Assessment tasks

- Project Plan
- Project Report
- Project Presentation
- Reflection
- Participation

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

- Identify and apply appropriate statistical techniques for authentic client projects
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work

Assessment tasks

- Project Plan
- Project Report
- Project Presentation
- Participation

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

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Ask appropriate questions to identify a statistical problem
- Improve ability to work co-operatively as a team member
- Give a verbal summary of a statistical investigation at a level appropriate for the audience
- Discuss the ethical aspects and implications of professional statistical work

Assessment tasks

- Project Plan
- Project Report
- Project Presentation
- Reflection

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Identify and apply appropriate statistical techniques for authentic client projects
- Enhance critical thinking skills through self reflection and peer assessment
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague
- Give a verbal summary of a statistical investigation at a level appropriate for the

audience

- Discuss the ethical aspects and implications of professional statistical work

Assessment tasks

- Project Plan
- Project Report

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Enhance critical thinking skills through self reflection and peer assessment
- Improve ability to work co-operatively as a team member
- Write reports at an appropriate statistical level for a client or a colleague

Assessment tasks

- Project Report
- Reflection