STAT8101

Sampling Design and Analysis

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Mathematical and Physical Sciences

Contents

General Information

Unit convenor and teaching staff
Lecturer/Convener
Hassan Doosti
hassan.doosti@mq.edu.au
Contact via Email
Room 534, 12 Wally's Walk
Please refer to iLearn for Consultation hours.

Lecturer/Convener
Georgy Sofronov
georgy.sofronov@mq.edu.au
Contact via Email
Room 529, 12 Wally's Walk
Please refer to iLearn for Consultation hours.

Credit points
10

Prerequisites
(STAT6180 or STAT806 or STAT810 or STAT8310 or STAT830(Cr) or STAT8830(Cr)) or
(BUSA8000 and ECON8040)

Corequisites

Co-badged status
This unit is co-badged with STAT7101.

Unit description
This unit introduces students to the fundamentals of sampling methodology and their analysis.
The unit covers the basic principles of sampling methods, survey design, questionnaire
construction, and data collection techniques. Throughout the unit, students will learn how to
use statistical software which will enable them to import, clean, and manipulate data, as well
as to visualise and summarise data. Additionally, students will apply an understanding of the
end-to-end process by designing a survey, collecting data, and performing exploratory data
analysis (EDA) on their data set, which will culminate in a final report. This unit contains
elements of Working Integrated Learning (WIL) that students will experience activities that
relate to or simulate professional practice as part of their learning.

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: Demonstrate an advanced understanding of the key principles of survey methodology, including different types of surveys, sampling methods, questionnaire design, and data collection techniques.

ULO2: Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.

ULO3: Design and justify sampling schemes to ensure ethical and inclusive practices, including for indigenous projects and data

ULO4: Use statistical software to import, clean, and manipulate survey data

ULO5: Perform exploratory data analysis (EDA) to summarise survey data

ULO6: Communicate survey findings in a clear manner to non-specialist audiences

ULO7: Demonstrate career planning and apply an understanding of the job market for statistics skills.

General Assessment Information

Requirements to Pass this Unit

To pass this unit you must achieve a total mark equal to or greater than 50%.

Hurdle Assessments

There are no hurdle assessments for this unit. Attendance and participation in the workshops is expected for this unit, and is part of the assessment.

Practice Based Skills for workshops

To foster the development of knowledge and skills, it is essential to engage in ongoing practice. This is facilitated through individual and group-based activities, conducted both before and during workshops. It is crucial that you demonstrate your progress in developing knowledge and skills through active participation in these activities. The final mark for this assessment will be determined based on your active engagement in 13 workshops, with the calculation of your final grade based on the best 10 workshop scores.

You do not need to submit an application for Special Consideration if you miss 3 or fewer workshops. In the event that you submit a Special Consideration request for Practice Based Skills workshops, you must specify in your application the total number of workshops you have missed for this unit. Requests with 3 or fewer missed workshops will be automatically declined, as you still have the opportunity to receive 10 workshop scores.

Late Assessment Submission Penalty

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 quizzes, workshop participation and presentations, students need to submit an application for Special Consideration.

In this unit, late submissions will be accepted as follows:

- Quizzes - NO, unless Special Consideration is granted
- Case Study - YES, Standard Late Penalty applies
- Group Project - YES, Standard Late Penalty applies
- Reflective Log-book - YES, Standard Late Penalty applies

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Assessment Tasks

Name	Weighting	Hurdle	Due
Practice Based Skills for workshops	10%	No	Weekly
Quizzes	20%	No	Weeks 4 and 8
Case Study	30%	No	Week 10
Group Project	30%	No	Week 12
Reflective Log-book	10%	No	Week 13

Practice Based Skills for workshops

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 0 hours
Due: **Weekly**
Weighting: **10%**

Development of knowledge and skills requires continual practice. During these workshops, you will practice a range of statistical concepts and techniques.

On successful completion you will be able to:

- Demonstrate an advanced understanding of the key principles of survey methodology, including different types of surveys, sampling methods, questionnaire design, and data collection techniques.
- Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.
- Design and justify sampling schemes to ensure ethical and inclusive practices, including for indigenous projects and data
- Use statistical software to import, clean, and manipulate survey data
- Perform exploratory data analysis (EDA) to summarise survey data
- Communicate survey findings in a clear manner to non-specialist audiences

Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Weeks 4 and 8**
Weighting: **20%**

Two quizzes, each worth 10%

On successful completion you will be able to:

- Demonstrate an advanced understanding of the key principles of survey methodology, including different types of surveys, sampling methods, questionnaire design, and data collection techniques.
- Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.
- Design and justify sampling schemes to ensure ethical and inclusive practices, including for indigenous projects and data
- Use statistical software to import, clean, and manipulate survey data
- Perform exploratory data analysis (EDA) to summarise survey data

Case Study

Assessment Type [1]: Case study/analysis
Indicative Time on Task [2]: 10 hours
Due: **Week 10**
Weighting: **30%**

Reviewing literature and delivering a "live" presentation with a focus on Indigenous issues

On successful completion you will be able to:
- Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.
- Design and justify sampling schemes to ensure ethical and inclusive practices, including for indigenous projects and data
- Communicate survey findings in a clear manner to non-specialist audiences

Group Project

Assessment Type [1]: Project
Indicative Time on Task [2]: 26 hours
Due: **Week 12**
Weighting: **30%**

In this project, students will need to define their research problems, choose a sampling and survey design, collect data and perform exploratory data analysis (EDA). Students will submit their work in multi-stages and ultimately communicate their findings in a report targetting non-specialist audiences.

On successful completion you will be able to:
- Demonstrate an advanced understanding of the key principles of survey methodology, including different types of surveys, sampling methods, questionnaire design, and data collection techniques.
- Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.
- Design and justify sampling schemes to ensure ethical and inclusive practices, including for indigenous projects and data

- Use statistical software to import, clean, and manipulate survey data

- Perform exploratory data analysis (EDA) to summarise survey data

- Communicate survey findings in a clear manner to non-specialist audiences

Reflective Log-book

Assessment Type [1]: Log book
Indicative Time on Task [2]: 5 hours
Due: **Week 13**
Weighting: **10%**

Reflective Log-book on your work on the Group Project and Career Activities

On successful completion you will be able to:

- Demonstrate an advanced understanding of the key principles of survey methodology, including different types of surveys, sampling methods, questionnaire design, and data collection techniques.

- Critically evaluate the methodology used in a survey and the reliability of the results for a given research question.

- Demonstrate career planning and apply an understanding of the job market for statistics skills.

[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

Classes

Workshops (beginning in Week 1): There is one two-hour class each week.

Required textbooks

The following textbooks are required in this unit. The Macquarie University library provides online access to these books:

- Lohr, S. L. (2021). *Sampling: Design and Analysis* (Third edition). CRC Press. https://doi.org/10.1201/9780429298899
- Lu, Y., & Lohr, S. L. (2021). R Companion for Sampling: Design and Analysis, Third Edition (1st ed.). Milton: CRC Press LLC.

Technology Used and Required

The R software (freely available online) will be used in the unit.

Methods of Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to the convenor can either be placed on the iLearn discussion board or sent to the staff email address from your university email address.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Week	Topic/s
1	Welcome & Introduction to Sampling - Chapter 1 of Lohr (2021)
2	Simple Random Sampling - Chapter 2 of Lohr (2021)
3	Stratified Sampling - Chapter 3 of Lohr (2021)
4	Ratio and Regression Estimation - Chapter 4 of Lohr (2021)
5	Cluster and Systematic Samplings - Chapter 5 of Lohr (2021)
6	Tidy Survey Analysis in R
7	Tidy Survey Analysis in R
8	Guest Speaker - Library Workshop
	TWO WEEK BREAK
9	Case Study Presentations
10	Non-response & Missing Data - Chapter 8 of Loht (2021)

Week	Topic/s
11	Non-response & Missing Data - Work on Group Project
12	Guest Speaker - Career development
13	Industry Guest Speakers

Please note that the order of the sessions may be subject to change based on the availability of guest speakers.

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 Advocacy provides independent advice on MQ policies, procedures, and processes

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.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page. Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. As such, no change to the delivery of the unit is planned, however we will continue to strive to improve the level of support and the level of student engagement.

Unit information based on version 2024.03 of the Handbook