UNSW Course Outline

MATH3831 Statistical Methods in Social and Market Research - 2024

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General Course Information

Course Code : MATH3831
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Mathematics & Statistics
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

In this course, students will develop skills important for the design and analysis of research in the social sciences and in market research. The specific focus will be on issues related to survey sampling, and questionnaire design and analysis. By the end of this course, students will be able

to identify an appropriate survey design for a particular situation, estimate the required sample sizes to achieve a given level of precision, estimate key quantities of interest (typically expressed as averages, totals or ratios), and make inferences about key quantities using their sample estimates. In addition, the course provides an opportunity to design a questionnaire suitable for answering a key research question and analyse responses to a questionnaire using a range of modern techniques. A weekly tutorial complements the recorded lecture series.
This course is suited primarily for students in their third year of study in Mathematics, Statistics, or related disciplines.

Course Aims

This course aims to develop skills important for the design and analysis of research in the social sciences and in market research. Specific focus will be on developing skills for survey sampling, and questionnaire design and analysis.

Relationship to Other Courses

This course requires MATH2801 (Theory of Statistics) or MATH2901 (Higher Theory of Statistics).

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe the common statistical sampling strategies for a variety of scenarios and recognise them from descriptions of survey methodologies.
CLO2 : Identify the appropriate sampling strategy for a given context in social and other research.
CLO3 : Estimate key population parameters and measures of uncertainty for a given sampling strategy.
CLO4 : Develop and critique questionnaires with respect to common issues in questionnaire design.
CLO5 : Generate and interpret computer output for questionnaire analysis, factor analysis and cluster analysis.

Course Learning Outcomes	Assessment Item
CLO1 : Describe the common statistical sampling strategies for a variety of scenarios and recognise them from descriptions of survey methodologies.	• Assignment 1 • Mid-term Test • Final Examination
CLO2 : Identify the appropriate sampling strategy for a given context in social and other research.	• Assignment 1 • Mid-term Test • Final Examination
CLO3 : Estimate key population parameters and measures of uncertainty for a given sampling strategy.	• Assignment 1 • Mid-term Test • Final Examination
CLO4 : Develop and critique questionnaires with respect to common issues in questionnaire design.	• Assignment 2 • Final Examination
CLO5 : Generate and interpret computer output for questionnaire analysis, factor analysis and cluster analysis.	• Assignment 2 • Final Examination

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate | Echo 360

Learning and Teaching in this course

- Lectures will be conducted in-person and live-streamed via Echo360.
- Consultation will take place in person or online via Blackboard Collaborate.
- All course materials will be available on course Moodle site.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 1 Assessment Format: Group	10%	Start Date: Monday of Week 2 Due Date: Monday of Week 7
Mid-term Test Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: Wednesday of Week 7
Assignment 2 Assessment Format: Group	20%	Start Date: Monday of Week 7 Due Date: Questionnaire: Friday of Week 8; Report: Friday of Week 10
Final Examination Assessment Format: Individual	50%	Start Date: Not Applicable Due Date: Exam period

Assessment Details

Assignment 1

Assessment Overview

In Week 2, you will be given one or more problems that can be solved using sampling. For each one, you may be asked to design a sample and provide estimates in a short paper, due Friday of Week 5.

Assessment criteria include:

1. correct identification of sampling designs;
2. use of appropriate sampling designs;
3. correct estimation of parameters and uncertainty;
4. clarity of your report.

Feedback will be given in the form of marks and comments from academic staff.

Course Learning Outcomes

- CLO1 : Describe the common statistical sampling strategies for a variety of scenarios and recognise them from descriptions of survey methodologies.
- CLO2 : Identify the appropriate sampling strategy for a given context in social and other research.
- CLO3 : Estimate key population parameters and measures of uncertainty for a given sampling strategy.

Detailed Assessment Description

In Week 2, you will be given one or more problems that can be solved using sampling. For each one, you may be asked to design a sample and provide estimates in a short paper, due Friday of Week 5.

Assessment criteria include:

1. correct identification of sampling designs;
2. use of appropriate sampling designs;
3. correct estimation of parameters and uncertainty;
4. clarity of your report.

Feedback will be given in the form of marks and comments from academic staff.

Assessment Length

At most 3600 words

Submission notes

Submission by Turnitin upload; group members also need to evaluate each others' contributions and team participation.

Assessment information

Standard late submission panalties apply to Assignment 1.

UNSW standard late submission penalty of:

· *5% per day,*

· *for all assessments where a penalty applies,*

· *capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and*

· *no permitted variation.*

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Mid-term Test

Assessment Overview

The midterm test is designed as a summative assessment covering the topics covered in weeks 1–5 inclusive. It will take place in Week 7. This is the only opportunity to complete the task with no alternatives times available unless special consideration is approved. Feedback will be provided in class, through inquiry with the course convenor, and by other means.

Course Learning Outcomes

- CLO1 : Describe the common statistical sampling strategies for a variety of scenarios and recognise them from descriptions of survey methodologies.
- CLO2 : Identify the appropriate sampling strategy for a given context in social and other research.
- CLO3 : Estimate key population parameters and measures of uncertainty for a given sampling strategy.

Detailed Assessment Description

The midterm test is designed as a summative assessment covering the topics covered in weeks 1–5 inclusive. It will take place in class in Week 7. This is the only opportunity to complete the task with no alternatives times available unless special consideration is approved. Feedback will be provided in class, through inquiry with the course convenor, and by other means.

Assessment Length

50 minutes

Submission notes

In-class written exam

Assessment information

On a successful Special Consideration outcome, the mark for this assessment will be interpolated via regression on the other assessments. This ensures that no student is advantaged or disadvantaged by being exempt.

Late submission is not applicable to Mid-term Test.

Assignment submission Turnitin type

Not Applicable

Assignment 2

Assessment Overview

Starting in Week 7, you will work in groups to design a questionnaire on a topic chosen from a given set of topics (or a self-proposed topic approved by the lecturer), collect data using the questionnaire, analyse the data, and write a project report. The questionnaire and the project report shall both be submitted as group work, at different due times:

- Questionnaire Friday Week 8
- Project Report Friday Week 10

The assessment criteria include:

1. appropriateness of questionnaire questions;
2. implementation of questionnaire design ideas;
3. valid criticisms of questionnaire design and data collection;
4. correct analysis and appropriate interpretation of results;
5. the clarity of the project paper.

Feedback will be given in the form of marks and comments from academic staff.

Course Learning Outcomes

- CLO4 : Develop and critique questionnaires with respect to common issues in questionnaire design.
- CLO5 : Generate and interpret computer output for questionnaire analysis, factor analysis and cluster analysis.

Detailed Assessment Description

Starting in Week 7, you will work in groups to design a questionnaire on a topic chosen from a given set of topics (or a self-proposed topic approved by the lecturer), collect data using the questionnaire, analyse the data, and write a project report. The questionnaire and the project report shall both be submitted as group work, at different due times:

- Questionnaire Friday Week 8
- Project Report Friday Week 10

The assessment criteria include:

1. appropriateness of questionnaire questions;
2. implementation of questionnaire design ideas;
3. valid criticisms of questionnaire design and data collection;

4. correct analysis and appropriate interpretation of results;
5. the clarity of the project paper.

Feedback will be given in the form of marks and comments from academic staff.

Assessment Length

Questionnaire: at most 1600 words; Report: 4000 words

Submission notes

Submission by Turnitin upload; group members also need to evaluate each others' contributions and team participation.

Assessment information

Standard late submission panalties apply to Assignment 2.

UNSW standard late submission penalty of:

· *5% per day,*

· *for all assessments where a penalty applies,*

· *capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and*

· *no permitted variation.*

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Final Examination

Assessment Overview

The final exam is a summative assessment of all the learning outcomes of this course, including all topics covered in lecture, tutorials, and assigned reading. Its duration is 2 hours long, and it will take place during the official exam period. Further details will be provided closer to the date. Feedback is available through inquiry with the course convenor.

Course Learning Outcomes

- CLO1 : Describe the common statistical sampling strategies for a variety of scenarios and recognise them from descriptions of survey methodologies.

- CLO2 : Identify the appropriate sampling strategy for a given context in social and other research.
- CLO3 : Estimate key population parameters and measures of uncertainty for a given sampling strategy.
- CLO4 : Develop and critique questionnaires with respect to common issues in questionnaire design.
- CLO5 : Generate and interpret computer output for questionnaire analysis, factor analysis and cluster analysis.

Detailed Assessment Description

The final exam is a summative assessment of all the learning outcomes of this course, including all topics covered in lecture, tutorials, and assigned reading. Its duration is 2 hours long, and it will take place during the official exam period. Further details will be provided closer to the date. Feedback is available through inquiry with the course convenor.

Assessment Length

2 hours

Submission notes

In-person written exam

Assignment submission Turnitin type

Not Applicable

General Assessment Information

In addition, an optional online quiz will be provided in Week 4 (the week before the census date) to assist you in deciding whether or not to remain in the course. The quiz will not count towards your mark in the course.

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Topic	• Approaches to samplesurvey design • Simple random sampling
	Reading	• L, Chapters 1 and 2 • C, Chapters 1–3
Week 2 : 3 June - 9 June	Topic	• Stratified sampling • Poststratification • Ratio estimation
	Reading	• L, Chapters 3 and 4 • C, Chapter 4
	Homework	• Assignment 1 released
Week 3 : 10 June - 16 June	Topic	• Estimation using auxiliary information
	Reading	• L, Chapters 4 • C, Chapter 5
Week 4 : 17 June - 23 June	Topic	• One-stage cluster sampling • Two-stage cluster sampling
	Reading	• L, Chapters 5 • C, Chapters 6
	Online Activity	• Self-assessment quiz
Week 5 : 24 June - 30 June	Topic	• Systematic sampling • Sampling with unequal probabilities
	Reading	• L, Chapter 2.8, 5.5, 6
Week 7 : 8 July - 14 July	Topic	• Questionnaire design • Attitude measurement
	Reading	• B, Chapters 5 and 9
	Assessment	• Midterm exam (in-class)
	Homework	• Assignment 1 due • Assignment 2 released
Week 8 : 15 July - 21 July	Topic	• Reliability and validity of measurement scales
	Reading	• B, Chapters 5 and 6
	Homework	• Assignment 2 Questionnaire due
Week 9 : 22 July - 28 July	Topic	• Factor analysis
	Reading	• H, Chapter 7
Week 10 : 29 July - 4 August	Topic	• Cluster analysis
	Reading	• H, Chapter 8
	Homework	• Assignment 2 Report due

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

The following schedule should be considered tentative and may change slightly.

Listed readings are useful references are not required reading.

Course Resources

Recommended Resources

The following readings are referenced on the course schedule.

Survey sampling references:

- **L**: Lohr, S. Sampling: Design and Analysis, Duxbury Press, 1999 (or newer editions). P 519.52/6 Level 2 Reserve.
- **S**: Scheaffer, R., Mendenhall, W., Ott, L. Elementary Survey Sampling. Fifth edition (or newer) Duxbury Press, 1996. P 519.52/5 Level 2 Reserve.
- **C**: Chambers, R. L., Clark, R. G. An Introduction to Model-Based Survey Sampling with Applications, Oxford University Press, 2012. Available online via UNSW library.

Questionnaire dsign and assessment:

- **B**: Babbie, E. R. The Practice of Social Research. Eleventh edition (or newer), Wadsworth, 2007. (How to pose survey questions.) S 300.72/58 Level 2 Reserve.

Multivariate analysis:

- **H**: Hair, Anderson, Tatham, Black. Multivariate Data Analysis. Six edition (or newer), Prentice-Hall, 2006. S 519.9/547.

Course Evaluation and Development

- An anonymous feedback form will be made available on the Moodle site.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Pavel Krivitsky		H13 Anita Lawrence Building East Entrance, Rm 1032		By appointment	Yes	Yes

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot

submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines

School-specific Information

School of Mathematics and Statistics and UNSW Policies

The School of Mathematics and Statistics has adopted a number of policies relating to enrolment, attendance, assessment, plagiarism, cheating, special consideration etc. These are in addition to the Policies of The University of New South Wales. Individual courses may also adopt other policies in addition to or replacing some of the School ones. These will be clearly notified in the Course Initial Handout and on the Course Home Pages on the Maths Stats web site. Students in courses run by the School of Mathematics and Statistics should be aware of the School and Course policies by reading the appropriate pages on the web site starting at: The School of Mathematics and Statistics assessment policies

The School of Mathematics and Statistics will assume that all its students have read and understood the School policies on the above pages and any individual course policies on the Course Initial Handout and Course Home Page. Lack of knowledge about a policy will not be an excuse for failing to follow the procedure in it.

Special Consideration - Short Extension Policy

The School of Mathematics and Statistics has carefully reviewed its range of assignments and projects to determine their suitability for automatic short extensions as set out by the UNSW Short Extension Policy. Upon comprehensive examination of our course offerings that incorporate these types of assessments, we have concluded that our current deadline structures already accommodate the possibility of unexpected circumstances that may lead students to require additional days for submission. Consequently, the School of Mathematics and Statistics has decided to universally opt out of the Short Extension provision for all its courses, having pre-emptively integrated flexibility into our assessment deadlines. The decision is subject to revision in response to the introduction of new course offerings. Students may still apply for Special Consideration via the usual procedures.

Computing Lab

The main computing laboratory is room G012 of the Anita B.Lawrence Centre (formerly Red Centre). You can get to this lab by entering the building through the main entrance to the School of Mathematics (on the Mezzanine Level) and then going down the stairs to the Ground Level. A second smaller lab is Room M020, located on the mezzanine level through the glass door (and

along the corridor) opposite the School's entrance.

For more information, including opening hours, see the computing facilities webpage. Remember that there will always be unscheduled periods when the computers are not working because of equipment problems and that this is not a valid excuse for not completing assessments on time.

School Contact Information

Please visit the School of Mathematics and Statistics website for a range of information.

For information on Courses, please go to “Student life & resources” and either Undergraduate and/or Postgraduate and respective "Undergraduate courses" and "Postgraduate courses" for information on all course offerings.

All school policies, forms and help for students can be located by going to the "Student Services" within “Student life & resources” page. We also post notices in "Student noticeboard" for your information. Please familiarise yourself with the information found in these locations. If you cannot find the answer to your queries on the web you are welcome to contact the Student Services Office directly.

Undergraduate

E: ug.mathsstats@unsw.edu.au

P: 9385 7011 or 9385 7053

Postgraduate

E: pg.mathsstats@unsw.edu.au

P: 9385 7053

Should we need to contact you, we will use your official UNSW email address of in the first instance. **It is your responsibility to regularly check your university email account. Please use your UNSW student email and state your student number in all emails to us.**