School of Information and Physical Sciences

STAT1070: Statistics for the Sciences
Callaghan
Semester 1 - 2024

OVERVIEW

Course Description

How do we use data to make informed scientific decisions? This course introduces students to statistical thinking, data collection, data presentation and statistical analysis. Examples from a range of science related disciplines are used to illustrate the key concepts.Although the emphasis is on applied data analysis rather than statistical theory, the course also provides an appropriate introduction for those students who intend to study statistics at a higher level.Interested in studying further statistics courses to develop your skills and improve your employability? Information about available statistics courses can be found here: https://www.newcastle.edu.au/school/mathematical-and-physical-sciences/study/statistics-courses

Academic Progress Requirements

Nil

Assumed Knowledge

Students who are not confident with their mathematics background are advised to complete MATH1001 Preparatory Studies in Mathematics before enrolling in STAT1070. Note: Knowledge of calculus and matrices is not required.

Contact Hours

Callaghan
Computer Lab
Face to Face On Campus
1 hour(s) per week(s) for 13 week(s) starting Week 1
Summer offering: 2 or 3 1-hour Computer Labs per Week for a total of 11 Computer Labs across the Full Term.
Lecture
Face to Face On Campus
2 hour(s) per week(s) for 13 week(s) starting Week 1
Summer offering: 2 or 3 2-hour Lecture recordings per Week for a total of 12 Lectures across the Full Term.
Tutorial
Face to Face On Campus
1 hour(s) per week(s) for 13 week(s) starting Week 1
Summer offering: 2 or 3 1.5-hour Tutorials per Week for a total of 11 Tutorials across the Full Term.

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator	**Callaghan** Dr Glen Livingston Jr Glen.Livingstonjr@newcastle.edu.au (02) 4921 6128 Consultation: To be advised on Canvas
Teaching Staff	Other teaching staff will be advised on the course Canvas site.
School Office	**School of Information and Physical Sciences** SR233, Social Sciences Building Callaghan CESE-SIPS-Admin@newcastle.edu.au +61 2 4921 5513 9am-5pm (Mon-Fri)

SYLLABUS

Course Content

- Introduction & overview of statistics in the sciences
- Understanding variation and describing univariate data
- Understanding bivariate relationships
- Collecting data - surveys and experiments
- Probability concepts
- Statistical inference hypothesis tests and confidence intervals
- Simple bivariate statistical models including regression and ANOVA

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Describe the role of statistics in developing scientific knowledge.

2. Explain how probability and sampling concepts relate to statistical analysis of data.

3. Apply basic principles of experimental design when collecting data.

4. Analyse data using common statistical software and interpret results to solve science related problems.

Course Materials

Other Resources:

- The statistical software jamovi is available in the university computing laboratories and will be used for computer labs and assignments. This software is available in open-access areas, such as in the libraries, student hubs, and many other buildings on campus with computer labs. You can also download the software for free to use on your personal computers at home or on campus.

- OpenIntro Statistics is a useful additional resource.

  David M. Dies, Christopher D. Barr, Mine Cetinkaya, OpenIntro Statistics, 4th edition, OpenIntro, 2019. This text is available at https://www.openintro.org/stat/textbook.php

- Course Notes are available on Canvas.

SCHEDULE

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Assignment	11:59pm Sunday 26 May 2023	Individual	15%	1, 2, 3, 4
2	Examination	Final Exam Period	Individual	40%	1, 2, 3, 4
3	Online Quiz (x6)	11:59pm Sunday, weeks 2, 4, 7, 9, 10, 12.	Individual	25%	1, 2, 3, 4
4	Mid Semester Test	In class during week 6	Individual	10%	1, 2, 3, 4
5	End of Semester Quiz	Opens Friday 7 June, closes 11:59pm Sunday 9 June 2023	Individual	10%	1, 2, 3, 4

Late Submissions   The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

For the Online Quizzes, attempts that are within seven days after the due date will be considered late, however no late penalty will be applied, nor is there a need to apply for adverse circumstances. The quiz results and feedback will be automatically released after seven days following the due date. No attempts under any circumstances will be allowed once the solutions and feedback are available. If you require more than a seven days extension for the Online Quizzes, you may apply for adverse circumstances and an alternative assessment may be arranged.

For the Assignment, given the need to provide timely feedback to students, the solutions will be released after seven days following the due date. Therefore, no submissions under any circumstances will be allowed once the solutions are available. If you require an extension at all for the Assignment, you may apply for adverse circumstances. If the extension is longer than seven days, an alternative assessment may be arranged.

Assessment 1 - Assignment

Assessment Type   Written Assignment
Description   The written assignment provides students with an opportunity to apply appropriate statistical methods to given problems and scenarios. It is designed to enable students to apply skills, developed in the tutorials and labs based on content in the lectures, which will be used throughout their program and careers.

Students will apply what they have learned to demonstrate knowledge of various statistical concepts, including the use of jamovi and other software to complement analysis.
Weighting   15%
Due Date   11:59pm Sunday 26 May 2023
Submission Method   Online
Assessment Criteria Criteria will be provided via Canvas.
Return Method   Online
Feedback Provided   Online - .

Assessment 2 - Examination

Assessment Type   Formal Examination
Description   Consists of written answer questions. The questions show output from statistical software and you should use the output to answer the questions provided.
Weighting   40%
Due Date   Final Exam Period

Submission Method	Formal Exam
Assessment Criteria	Criteria will be provided via Canvas.
Return Method	Not Returned
Feedback Provided	No Feedback - .

Assessment 3 - Online Quiz (x6)

Assessment Type	Quiz
Description	Each online quiz consists of 10 multiple choice style questions. Students are allowed up to 60 minutes to complete the quiz, but should be able to complete it within 30 minutes.
	These six quizzes are designed to test knowledge of lecture, tutorial and lab materials and help students maintain engagement with the course. The online nature of the quizzes facilitates timely feedback on student learning; this, coupled with the regularity of testing, enables students to self-assess their methods of studying and learning the course materials, and adjust practices as necessary in preparation for future quizzes and assessments.
	The quizzes highlight any areas where students may require further development or new approaches to learning which should stimulate discussion with tutors and lecturers.
	An individual student's best 5 scores of the 6 quizzes attempted will be used for the final score which contributes 25% to the course.
Weighting	25%
Due Date	11:59pm Sunday, weeks 2, 4, 7, 9, 10, 12.
Submission Method	Online
Assessment Criteria	Criteria will be provided via Canvas.
Return Method	Online
Feedback Provided	Online - .
Opportunity to Reattempt	Students WILL be given the opportunity to reattempt this assessment. 1 reattempt allowed.

Assessment 4 - Mid Semester Test

Assessment Type	In Term Test
Description	The in-term test will cover the material from weeks 1 to 5 inclusive.
Weighting	10%
Due Date	In class during week 6.
Submission Method	In class
Assessment Criteria	Criteria will be provided via Canvas.
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 5 - End of Semester Quiz

Assessment Type	Quiz
Description	The End of Semester Quiz covers all of the material from weeks 1 to 12 inclusive.
Weighting	10%
Due Date	Opens Friday 7 June, closes 11:59pm Sunday 9 June 2023
Submission Method	In class
Assessment Criteria	Criteria will be provided via Canvas.
Return Method	Not Returned
Feedback Provided	No Feedback

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description

85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Attendance	Attendance/participation will be recorded in the following components: - Computer Lab (Method of recording: UoN Attendance Application)
Communication Methods	Communication methods used in this course include:
Course Evaluation	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.
Oral Interviews (Vivas)	As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.
Academic Misconduct	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.
Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: 1. the assessment item is a major assessment item; or 2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; 3. you are requesting a change of placement; or 4. the course has a compulsory attendance requirement. Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.