

STAT1100: Data Wrangling and Visualisation

Callaghan

Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Extracting and communicating information from data lies at the heart of statistics and data science. In practice, data is not often in an immediately useable format, requiring management, manipulation and error-checking. Visualisation of data is an invaluable asset in finding and communicating key information as well as in error-checking. By the end of this course students will be able to effectively work with introductory methods for data wrangling and visualisation of data while developing coding skills using the Python language which is one of the most popular and preferred languages used in practice. No prior programming experience is necessary.

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/information-physical-sciences/study/statistics-courses>

Academic Progress Requirements

Nil

Contact Hours

Callaghan

Computer Lab *

Face to Face On Campus

2 hour(s) per week(s) for 13 week(s) starting Week 1

Lecture

Face to Face On Campus

2 hour(s) per week(s) for 13 week(s) starting Week 1

Unit Weighting Workload

* This contact type has a compulsory requirement.

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

COURSE OUTLINE

CONTACTS

Course Coordinator **Callaghan**
Dr Kirill Glavatskiy
Kirill.Glavatskiy@newcastle.edu.au
Consultation: TBA 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
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9am-5pm (Mon-Fri)

SYLLABUS

Course Content

- Presentation and interpretation of data
- Processes for data checking, cleaning, filtering, and dealing with errors
- Understanding types of data
- Exploratory data techniques
- Introduction to data modelling and analysis
- Presenting data using Python data analysis libraries
- Visualisation using Python data visualisation libraries
- Applications of data wrangling in science and industry

Course Learning Outcomes **On successful completion of this course, students will be able to:**

1. Implement data checking, wrangling, tidying, and basic management methods.
2. Apply exploratory techniques to identify and describe underlying patterns in data.
3. Identify and avoid common flaws in the presentation of data.
4. Communicate and report upon data effectively.
5. Analyse, visualise, and report on data using the Python programming language.
6. Recognize how data wrangling is implemented in real-life applications

Course Materials Lecture and Lab notes will be provided via Canvas

Required Text:
Interactive data visualization: foundations, techniques, and applications
Matthew Ward, Georges Grinstein, Daniel Keim
Boca Raton, Florida ; London, England ; New York, New York : CRC Press, 2015

Recommended Reading:
Data Visualization: Charts, Maps, and Interactive Graphics
Robert Grant. New York: Chapman and Hall/CRC, 2018

Practical Python Data Wrangling and Data Quality
McGregor, Susan E. Sebastopol : O'Reilly Media, Incorporated, 2021

Data wrangling with Python
Jacqueline Kazil and Katharine Jarmul. Sebastopol, California : O'Reilly, 2016

COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Contact Hour Requirements:

Computer Lab There is a compulsory attendance requirement in this course. Students must attend a minimum of 80% of computer labs

SCHEDULE

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Online Quizzes	Quizzes will be open for a limited time during Weeks 3, 6, 9, and 12	Individual	40%	1, 2, 3, 4, 5
2	Written Assignment 1	Week 5	Individual	15%	1, 2, 3, 4, 5
3	Written Assignment 2	Week 10	Individual	15%	1, 2, 3, 4, 5, 6
4	Formal exam	Formal Examination Period	Individual	30%	1, 2, 3, 4, 5, 6

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.

Assessment 1 - Online Quizzes

Assessment Type	Quiz
Description	Four quizzes. Each quiz is worth 10 % of the total mark.
Weighting	40%
Due Date	Quizzes will be open for a limited period of time during Weeks 3, 6, 9, and 12
Submission Method	Online
Assessment Criteria	Criteria will be provided via Canvas
Return Method	Online
Feedback Provided	Online - .
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Written Assignment 1

Assessment Type	Written Assignment
Description	First of two reports. Each Assignment is worth 15 % of the total mark.
Weighting	15%
Due Date	Week 5
Submission Method	Online
Assessment Criteria	Criteria will be provided via Canvas
Return Method	Online
Feedback Provided	In Class
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 3 - Written Assignment 2

Assessment Type	Written Assignment
Description	Second of two reports. Each Assignment is worth 15 % of the total mark.
Weighting	15%
Due Date	Week 10
Submission Method	Online
Assessment Criteria	Criteria will be provided via Canvas
Return Method	Online
Feedback Provided	In Class - .
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 4 - Formal exam

Assessment Type	Formal Examination
Description	Consists of written-answer questions.
Weighting	30%
Due Date	Formal Examination Period
Submission Method	Formal Exam
Assessment Criteria	Criteria will be provided via Canvas
Return Method	Not Returned
Feedback Provided	No Feedback - .
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

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: All students' attendance will be recorded using the Attendance Check-in app on myUON)

Communication Methods	Communication methods used in this course include: <ul style="list-style-type: none">- Email: Students will receive communications via their student email account.- Face to Face: Communication will be provided via face to face meetings or supervision.- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
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: <ol style="list-style-type: none">1. the assessment item is a major assessment item; or2. 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; or4. 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.
Other Information	<ol style="list-style-type: none">1. The teaching/assessment schedule is subject to change. Changes will be posted on Canvas LMS.2. Detailed assessment criteria for written assignments and any additional material will be available on the Canvas site no less than two weeks prior to the due date of each assessment.3. All assignments must be done and submitted individually.4. Examination details and conditions will be provided separately

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.

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