



Science

STATS 301 : Statistical Programming and Modelling using SAS (15 POINTS)

Course Prescription

Introduction to the SAS statistical software with emphasis on using SAS as a programming language for purposes of database manipulation, simulation, statistical modelling and other computer-intensive methods.

Course Overview

This is a course in statistical data analysis which has an emphasis on learning how to use the SAS statistical package. In addition to learning how to manipulate data using SAS, the course covers a variety of linear models, including generalised linear models. Students learn how to interpret and communicate statistical findings. Topics covered include: SAS specific data acquisition and manipulation: Creating and saving code, creating and permanently saving data, importing data from other statistical packages, creating and coding variables, use of SAS functions, sub-setting data, concatenating data, merging data, working with arrays, collapsing data and reshaping data. Linear Models: Introduction to regression. Trend and scatter. Simple linear regression. Regression model assumptions, diagnostics, and prediction. Transformations. One sample t-test. Paired and non-paired data. Non-linear trends. Two sample linear models. Dummy variables. Strengths and weaknesses of transformations. Models including interactions. Multiple regression including exploratory tools, factors and diagnostics. One-way ANOVA and two-way ANOVA, including understanding interactions. Generalised linear models for binary data (logistic, and poisson regression).

The skills developed in this course are particularly useful for those wishing to have a career using SAS for data analysis such as in Medicine, the Pharmaceutical industry, Finance, Data mining companies, Market research and Statistical agencies e.g. Stats NZ.

Course Requirements

Prerequisite: 15 points from STATS 201, 207, 208, BIOSCI 209 Restriction: STATS 785

Capabilities Developed in this Course

- Capability 1: Disciplinary Knowledge and Practice
- Capability 2: Critical Thinking
- Capability 3: Solution Seeking
- Capability 4: Communication and Engagement

Capability 5: Independence and Integrity

Capability 6: Social and Environmental Responsibilities

Graduate Profile: [Bachelor of Science](#)

Learning Outcomes

By the end of this course, students will be able to:

1. Be able to use SAS to manipulate and analyse data. (Capability 1 and 3)
2. Use appropriate tools for exploratory data analysis. (Capability 1 and 3)
3. Summarise the main points of exploratory and model fitting phase of the analysis using technical language. Also be able to communicate the mathematical formula for the final model fitted to the data. (Capability 1, 2, 4 and 5)
4. Use statistical findings to answer key questions in appropriate context. (Capability 1, 2 and 3)
5. Be able to communicate the main findings from an analysis of data to those who know little or nothing about statistics. (Capability 1, 2, 4, 5 and 6)

Assessments

Assessment Type	Percentage	Classification
Assignments	30%	Individual Coursework
Test	20%	Individual Test
Final Exam	50%	Individual Examination
3 types	100%	

Assessment Type	Learning Outcome Addressed				
	1	2	3	4	5
Assignments	✓	✓	✓	✓	✓
Test	✓	✓	✓	✓	
Final Exam	✓	✓	✓	✓	✓

You must get at least 50% in the course work and at least 50% in the final exam.

Key Topics

A student who successfully completes this course will have an understanding of:

- How to appreciate the usefulness and ubiquity of SAS in various industries – e.g. Medicine, Finance, Marketing.
- The ‘architecture’ of SAS and solving problems as and when they arise.

- How to configure data from disparate data sources into a format that SAS can 'read in' and hence summarise data.
- How to use the SAS statistical package to appropriately model any underlying relationships.
- How to communicate the main findings from an analysis in written form, using non-technical language.

Special Requirements

You must get at least 50% in the course work and at least 50% in the final exam.

Workload Expectations

This condensed course is a standard 15 point course and students are expected to spend 10 hours for each 1 point course that they are enrolled in.

For this course, you can expect a standard workload of a total of 150 hours or 25 hours per week comprising 6 hours of lectures, and a 1 hour computer laboratory per week with the rest of the time reading, studying and doing assignments.

Delivery Mode

Campus Experience

Attendance is expected at scheduled activities including labs/tutorials to complete the components of the course.

Lectures will be available as recordings. Other learning activities including tutorials/labs will be available as recordings, but may not be very instructive as these are individual help sessions.

The course will not include live online events including tutorials.

Attendance on campus is required for the exam and for the test, if the test is not an online test.

The activities for the course are scheduled as a condensed weekly timetable.

Learning Resources

Course materials are made available in a learning and collaboration tool called Canvas which also includes the lecture recordings. Course books can be purchased from the Student Resource Centre. Please let the Lecturer know in advance if you wish to purchase one so that they can be ordered.

Please remember that the recording of any class on a personal device requires the permission of the instructor.

Student Feedback

During the course Class Representatives in each class can take feedback to the staff responsible for the course and staff-student consultative committees.

At the end of the course students will be invited to give feedback on the course and teaching through a tool called SET or Qualtrics. The lecturers and course co-ordinators will consider all feedback.

Your feedback helps to improve the course and its delivery for all students.

Course notes have been updated in response to student feedback.

Digital Resources

Course materials are made available in a learning and collaboration tool called Canvas which also includes reading lists and lecture recordings (where available).

Please remember that the recording of any class on a personal device requires the permission of the instructor.

Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting their learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the internet. A student's assessed work may be reviewed against online source material using computerised detection mechanisms.

Copyright

The content and delivery of content in this course are protected by copyright. Material belonging to others may have been used in this course and copied by and solely for the educational purposes of the University under license.

You may copy the course content for the purposes of private study or research, but you may not upload onto any third party site, make a further copy or sell, alter or further reproduce or distribute any part of the course content to another person.

Inclusive Learning

All students are asked to discuss any impairment related requirements privately, face to face and/or in written form with the course coordinator, lecturer or tutor.

Student Disability Services also provides support for students with a wide range of impairments, both visible and invisible, to succeed and excel at the University. For more information and contact details, please visit the [Student Disability Services' website](http://disability.auckland.ac.nz) <http://disability.auckland.ac.nz>

Special Circumstances

If your ability to complete assessed coursework is affected by illness or other personal circumstances outside of your control, contact a member of teaching staff as soon as possible before the assessment is due.

If your personal circumstances significantly affect your performance, or preparation, for an exam or eligible written test, refer to the University's [aegrotat or compassionate consideration page](https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html) <https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html>.

This should be done as soon as possible and no later than seven days after the affected test or exam date.

Learning Continuity

In the event of an unexpected disruption we undertake to maintain the continuity and standard of teaching and learning in all your courses throughout the year. If there are unexpected disruptions the University has contingency plans to ensure that access to your course continues and your assessment is fair, and not compromised. Some adjustments may need to be made in emergencies. You will be kept fully informed by your course co-ordinator, and if disruption occurs you should refer to the University Website for information about how to proceed.

Level 1: Delivered normally as specified in delivery mode.

Level 2: You will not be required to attend in person. All teaching and assessment will have a remote option.

Level 3: All teaching activities and assessments are delivered remotely.

Student Charter and Responsibilities

The Student Charter assumes and acknowledges that students are active participants in the learning process and that they have responsibilities to the institution and the international community of scholars. The University expects that students will act at all times in a way that demonstrates respect for the rights of other students and staff so that the learning environment is both safe and productive. For further information visit [Student Charter](https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html) <https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html>.

Disclaimer

Elements of this outline may be subject to change. The latest information about the course will be available for enrolled students in Canvas.

In this course you may be asked to submit your coursework assessments digitally. The University reserves the right to conduct scheduled tests and examinations for this course online or through the use of computers or other electronic devices. Where tests or examinations are conducted online remote invigilation arrangements may be used. The final decision on the completion mode for a test or examination, and remote invigilation arrangements where applicable, will be advised to students at least 10 days prior to the scheduled date of the assessment, or in the case of an examination when the examination timetable is published.