



Science

STATS 210 : Statistical Theory (15 POINTS)

Course Prescription

Probability, discrete and continuous distributions, likelihood and estimation, hypothesis testing.

Course Overview

STATS 210 introduces the theory that underlies the statistical methods used in practical statistics courses. It is aimed at students who enjoy maths and are interested in probability and statistics. It is a core course for students in the Statistics and Probability pathway and optional for those pursuing the Applied Statistics pathway, a Statistics major, or a Data Science Specialisation. It is useful for students with interests in Econometrics, Operations Research, Finance, and theoretical aspects of Marketing Research, as well as those who have Maths or Statistics as their main interest. STATS 210 is a prerequisite for STATS 310.

If you have a weak mathematics background (C+ or lower in Stage 1 mathematics and/or STATS 125) then it is recommended that you take STATS 210 after passing the stage 2 mathematics co-requisite rather than taking it at the same time as the stage 2 mathematics co-requisite. Doing this will substantially improve your chances of passing this course.

Course Requirements

Prerequisite: 15 points from ENGSCI 111, ENGGEN 150, STATS 125 Corequisite: 15 points from MATHS 208, 250, ENGSCI 211 or equivalent

Capabilities Developed in this Course

Capability 1: Disciplinary Knowledge and Practice

Capability 2: Critical Thinking

Capability 3: Solution Seeking

Graduate Profile: [Bachelor of Science](#)

Learning Outcomes

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

1. Quantify uncertainty and randomness by using probability. (Capability 1)
2. Employ discrete distributions for modelling the outcome of the experiments. (Capability 1)
3. Compute probabilities for continuous random variables by using probability density function and cumulative distribution function. (Capability 1)
4. Perform hypothesis tests in a variety of situations involving both discrete and continuous random variables. (Capability 3)
5. Estimate the parameters of continuous or discrete distributions by using maximum likelihood methodology. (Capability 3)
6. Calculate expectation and variance for discrete and continuous random variables. (Capability 3)
7. Transform discrete and continuous random variables. (Capability 3)
8. Differentiate between reasonable and unreasonable solutions to probability problems (Capability 1, 2 and 3)

Assessments

Assessment Type	Percentage	Classification
Assignments	22%	Individual Coursework
Tutorials	8%	Individual Coursework
Online Test	10%	Individual Coursework
Final Exam	60%	Individual Examination
4 types	100%	

Assessment Type	Learning Outcome Addressed							
	1	2	3	4	5	6	7	8
Assignments	✓	✓	✓	✓	✓	✓	✓	✓
Tutorials	✓	✓	✓	✓	✓	✓	✓	✓
Online Test	✓	✓		✓	✓	✓		✓
Final Exam	✓	✓	✓	✓	✓	✓	✓	✓

Students must score a minimum of 45% in their exam in addition to an overall mark of 50% to pass the course.

Tuākana

The Department of Statistics has a team of eight Tuākana tutors covering our Stage 1 and Stage 2 courses, including STATS 210. For details and online session times, visit <https://www.auckland.ac.nz/en/science/study-with-us/maori-and-pacific-at-the-faculty/tuakana-programme.html>.

Special Requirements

The online test may be held in the evening. Students will be notified on Canvas about date and time.

It is advantageous to attend tutorials as help is available there to complete tutorial questions. (Tutorial questions are also available on Canvas)

Workload Expectations

This course is a standard 15 point course and students are expected to spend 150 hours per semester involved in each 15 point course that they are enrolled in.

For this course, you can expect 3 hours of lectures, a 1 hour tutorial, 4 hours of reading and thinking about the content and 4.5 hours of work on assignments and/or test preparation (per week).

Delivery Mode

Campus Experience

Lectures will be available as recordings.

Learning Resources

The course book will be available for purchase. A digital copy will be available on Canvas.

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.

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 / 4: 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.