



Data Science Āta Mātai Raraunga

"Machine learning and AI are the most transformative technologies of the 21st century. My career in Data Science allows me to work on the cutting-edge of these fields, and to be part of building a better, smarter, and more dynamic world."

Christopher Laing
Data Science Lead, Xero

The science of learning from data

Data is at the core of modern society. We are producing it, collecting it, wrangling it, analysing it, modelling it, understanding it, visualising it, using it on a scale that seemed impossible not so long ago. Data Science is fundamentally about how we can learn from data and how we can meaningfully use it to improve our world. Studying Data Science leads to opportunities in fields as diverse as banking and biotechnology, entertainment and education, gaming and government, medicine and manufacturing, retail and research.

Data Science is also a broad area of study. At Otago, the Data Science programme pulls together the best that computer science, information science, and statistics have to offer while stressing application and an understanding of the impact of Data Science on society.

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Why study Data Science?

Data is everywhere and the demand for data scientists is exploding. Data Science is a broad field but it essentially boils down to extracting information from large and complex data sets. Working as a data scientist for an organisation means you will be at the heart of decision-making processes.

Data Science brings together techniques and methods from computer science, information science, and statistics. This means there are opportunities in areas that particularly interest you, whether it is efficient computation, data storage infrastructure, data analysis or applied machine learning. In addition to problem-solving skills that can be applied to many areas, you will gain valuable communication and data visualisation skills.

Background required

Entry into the Bachelor of Applied Science (BAppSc) in Data Science is open to anyone. However, taking digital technologies for NCEA is useful and NCEA level 3 mathematics and statistics is helpful.

Career opportunities

There are opportunities for Data Science graduates at all levels of business, industry, government, and science.

Can I combine Data Science with other subjects?

Yes. Because Data Science is a major for the Bachelor of Applied Science, you will need a minor or a second major in an approved subject area. There are a large number of subject areas to choose from in Applied Science, Arts and Music, Science, as well as all Commerce subjects. You may even choose Computer Science, Information Science or Statistics.

What will I learn?

Data Science brings together techniques and methods from computer science, information science, and statistics to extract insight from large and complex data sets, and to communicate this acquired knowledge through effective modelling and visualisation. You will learn how to acquire, handle and analyse data to solve problems in a wide variety of areas. You will also learn to think critically and ethically about the increasing role Data Science plays in society.

How will I learn?

The programme is delivered using lectures, tutorials, and practical labs. Assessment is a combination of assignments, projects, presentations, and exams. There will be opportunities to work in groups.

First-year papers

COMP 101 Foundations of Information Systems

This paper provides an introduction to the methods and technologies used to build the information systems that run our modern world. You will learn how data is encoded for computer processing, the basics of algorithms and how machines execute processes to process data. In addition, you will learn the fundamental concepts of storing and managing data using relational databases, and how to manipulate these databases using query language. Finally, you will examine contemporary issues in Information and Communication Technology (ICT) and discuss how the use of ICT impacts on our daily life.

COMP 120 Practical Data Science

An introduction to the techniques used to prepare, integrate, manage and visualise complex data using modern software environments. This paper introduces the fundamental concepts of data science to students through practical use of the industry-standard software environment R. You will learn how to program in R, how to effectively manage and manipulate data in R, and be exposed to the "round trip" of data science (Import, Tidy, Transform, Visualise, Model, and Communicate).

COMP 161 Computer Programming

An introduction to computer programming suitable for beginners with little or no prior experience. Introduces the Java programming language, basic object oriented concepts, and simple graphical applications.

COMP 162 Foundations of Computer Science

An introduction to computer programming suitable for beginners with some prior experience. Builds on and extends basic Java and object-oriented programming. Introduces broader programming concepts and other languages.

STAT 110 Statistical Methods or STAT 115 Introduction to Biostatistics

These papers provide an introduction to the use of statistical methods for the description and analysis of data, use of computer software to carry out data analysis, and the interpretation of the results of statistical analyses for a range of research studies.

You are also strongly encouraged to take **MATH 130 Fundamentals of Modern Mathematics 1**.

Second-year papers

COSC 201 Algorithms and Data Structures

INFO 204 Introduction to Data Science

STAT 210 Applied Statistics

STAT 260 Visualisation and Modelling in R

Third-year papers

COSC 343 Artificial Intelligence

INFO 304 Advanced Data Science

STAT 312 Modelling High Dimensional Data and

COSC 344 Database Theory and Applications, or STAT 310 Statistical Modelling

In addition, you will need to meet the requirements for a minor or a second major in an approved subject area.

For questions about
Data Science
otago.ac.nz/dasc

