

# MSc Data Science

DELIVERED IN  
EXETER AND LONDON



# DATA SCIENCE AT THE UNIVERSITY OF EXETER

The University of Exeter's MSc Data Science is an innovative taught course targeted at employed professionals, delivered in both Exeter and London.

The MSc Data Science, delivered under the degree apprenticeship levy, provides commercial and public sector organisations with an opportunity to develop, reward and retain talented data scientists, bringing cutting-edge knowledge and expertise into the organisation. Participants are given the opportunity to develop their skills in data science and gain a formal qualification, while remaining in full time employment.

The programme is distinctive in the way it minimises disruption to employers. Teaching is structured around a series of 3-day residentials (approximately one per month) supplemented with individual self-study and coursework. Taught content is delivered at the University of Exeter and in Central London. Residentials incorporate lectures, workshops, seminars, group work and technology insights. Students are closely supported by academic and employer mentors in both their studies and work-based projects.

We recognise that all students come with their own unique set of skills and knowledge and this is reflected in the module selection. Content covers fundamental mathematical and computational techniques for data science, machine learning and statistical modelling approaches to create insights from complex datasets, as well as the wider social context and specific applications of data science in diverse areas. Additionally, assignments are focused around the apprentice's employer and work commitments to ensure that content is always relevant and beneficial to their organisation.

## Contact

For more information about this programme, contact:

**Korneel Verhaeghe**  
k.verhaeghe@exeter.ac.uk  
01392 726225

**Russell Etherington**  
r.b.etherington@exeter.ac.uk  
01392 727431



Teaching Excellence  
Framework assessment 2017



5 star rated from QS



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# PROGRAMME MODULES

Please note that availability of all modules is subject to demand and to timetabling constraints and that not all modules may be available every year. For up-to-date details of all our programmes and modules, please check the Degree Apprenticeships section of the University of Exeter website at:

[www.exeter.ac.uk/business/people/degreeapprenticeships/datascience](http://www.exeter.ac.uk/business/people/degreeapprenticeships/datascience)

## Core Modules

### Introduction to Data Science

Understand the data science revolution and learn about this broad and fast-moving field. Explore the ways in which data science and artificial intelligence are transforming business and society. Develop fundamental skills in programming, data-handling, visualisation and statistics, and learn context and vocabulary to support later, more detailed study.

### Fundamentals of Data Science

Data science depends on a solid grounding in mathematics and programming. Develop core mathematical and computational skills essential for further study, including linear algebra, probability and common computational tools/packages. Learn how to process large datasets efficiently using optimisation techniques.

### Learning from Data

Use machine learning and statistical modelling methods to effectively derive insight from data. Deal with real data to understand the theory and practice of the principal learning paradigms. Apply machine learning methods such as classification and unsupervised learning, alongside statistical techniques such as regression and clustering. Use, modify and write software to visualise data and help make better decisions.

### Data in Business and Society

The social context of data science is essential background for any data scientist. Learn about ethical issues, privacy, governance, legal frameworks and legislation. Consider how complex and powerful technologies such as machine learning, artificial intelligence and big data can be responsibly managed for the benefit of individuals, organisations and society. Learn how to lead multidisciplinary teams to design, create and implement data solutions in a business context.

### Machine Learning

Learn about the most prominent supervised and unsupervised machine learning techniques currently applied to, for example, image and speech analysis, medical imaging, and data analysis in science and engineering. Gain a thorough grounding in the theory and application of machine learning, including pattern recognition, classification, categorisation, and concept acquisition. Discover and apply state-of-the-art techniques such as artificial neural networks and transfer learning.

### Statistical Modelling

Look in greater detail at the concepts and methods of modern statistics. Learn fundamental concepts in experimental design and classical techniques for statistical inference. Apply a range of statistical tools for point/interval estimation, hypothesis testing, linear (multiple) regression, generalised linear models and mixed-effects models. Look at the philosophy and practice of Bayesian inference and analysis, and the philosophical comparisons of the latter to classical statistical methods.

## Optional Modules

(choose 2 from 4)

### Machine Vision

Learn computer vision and image processing techniques to extract meaningful information from the huge volume of images and video content that is now available, such as medical imaging, satellite based remote sensing and social media content. Cover the essential challenges and key algorithms for solving a variety of problems related to the automated processing of visual data.

### High Performance Computing and Data Architectures

Learn the skills and knowledge to exploit modern computational resources for data-intensive analysis, high-performance computing and how to manipulate large datasets. Study the diverse range of architectures for storing and processing data, and cover the core principles underlying the design of software and hardware for handling high demand computation.

### Information Security

Gain a solid understanding of the vulnerabilities of data collection, storage and communication in modern computer systems, networks and online environments. Explore the foundations of computer security, techniques to secure complex digital systems and gain practical experience in secure management against malicious and criminal exploitation.

### Social Networks and Text Analysis

The Web has created complex, relational datasets which are best understood using a network perspective. Much online data is unstructured text, requiring computational methods for analysis of text at scale. Learn the core principles of network science and text analysis using appropriate tools, then apply them to generate insights from complex networks and large text corpora.

## Research Projects

### Research Project A

Apply the knowledge learned in the first year to a significant independent data science project, based on a real-world problem relevant to the student's business context. Develop project planning, management and implementation skills, as well as experience in independent learning, presentation and writing. Complete an end-to-end project supported by an academic/industry supervisory team.

### Research Project B

Enhance and hone the skills acquired throughout the Masters programme to produce a more advanced data science project focused on the student's business organisation. Develop a deep understanding of the business requirements and skills needed to produce effective data science projects for genuine applications.





# PROGRAMME STRUCTURE

Our MSc Data Science degree apprenticeship is delivered to two parallel cohorts based in Exeter and London.

Apprentices are full-time employees of their organisation, gaining a University of Exeter degree alongside work.

The expected commitment is (approximately):

**Term 1 and 2:**

- 4 x 3-day blocks of face-to-face teaching per term (approximately one per month)
- Coursework and self-study

**Term 3:**

- Individual research projects

**Entry requirements**

A good honours degree in a numerate subject from a recognised university. Students are expected to enter this programme with some programming ability.

The Python programming language is used extensively during this course and applicants with experience in other languages will be asked to learn basic Python before commencing the course.

Other qualifications of a similar level can be considered. We would encourage applicants with non-standard qualifications to contact us to discuss their eligibility.

	Term 1		Term 2		Term 3
Year One	Introduction to Data Science	Fundamentals of Data Science	Learning From Data	Data in Business and Society	Research Project 1
Year Two	Machine Learning	Statistical Modelling	Optional Module 1	Optional Module 2	Research Project 2

\*Optional modules available may alter. Current optional modules include: Machine Vision; High Performance Computing and Data Architectures, Social Networks and Text Analysis, and Information Security.



# UNIVERSITY OF EXETER DEGREE APPRENTICESHIPS

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## Digital and Technology Solutions Degree Apprenticeship

BSc Digital and Technology Solutions is a full University of Exeter degree, studied over four years through a mix of on-campus residentials, e-learning and real-world projects.

[www.exeter.ac.uk/business/people/degreeapprenticeships/dts](http://www.exeter.ac.uk/business/people/degreeapprenticeships/dts)

## Senior Leader Degree Apprenticeship

Our Masters level Degree Apprenticeship is accredited by the Chartered Management Institute (CMI) and represents an exciting opportunity to gain a prestigious MBA.

[www.exeter.ac.uk/business/people/degreeapprenticeships/mba](http://www.exeter.ac.uk/business/people/degreeapprenticeships/mba)

## Civil Engineering Degree Apprenticeship

The Civil Engineering Degree Apprenticeship is unique in that it caters for both the Civil Engineering Site Management Degree Apprenticeship standard and the Civil Engineer Degree Apprenticeship standard.

[www.exeter.ac.uk/business/people/degreeapprenticeships/civilengineering](http://www.exeter.ac.uk/business/people/degreeapprenticeships/civilengineering)

## Contact:

For more information about this programme contact

Russell Etherington, 01392 72 74 31 or email [R.B.Etherington@exeter.ac.uk](mailto:R.B.Etherington@exeter.ac.uk)

Korneel Verhaeghe, 01392 72 62 25 or email [K.Verhaeghe@exeter.ac.uk](mailto:K.Verhaeghe@exeter.ac.uk)