

Postgraduate Diploma in Data Science



DATA SCIENCE
INSTITUTE

THE PROFESSIONAL STANDARD IN DATA SCIENCE EDUCATION



WOLF/

www.datascienceinstitute.net

Overview

The Postgraduate Diploma in Data Science is a fully rounded programme covering the key skills and knowledge needed by data scientists to develop insights and solutions across a wide range of industries and domains.

It has been developed by practising data scientists with experience working with major international firms across a wide range of industries.

They have identified key skills required for data scientists and have also ensured the course content conforms to the Edison European Data Science Framework's Body of Knowledge (DS-BoK).



Aims

The overall aims of the Postgraduate Diploma in Data Science will enable you to:

- Gain the mathematical and statistical knowledge and understanding needed to carry out data analysis to an advanced level
- Develop essential data science skills in the R, Python and SQL programming languages
- Develop a strong understanding of data management, including evaluation, structuring and cleaning of data for analysis
- Become familiar with and apply the tools and techniques used in data visualisation
- Develop a comprehensive knowledge of classical data analytics, including statistical inference, predictive modelling and time series analysis
- Use new generation algorithms for supervised and unsupervised machine learning
- Apply a wide range of data science skills, knowledge and techniques within real world contexts, including building a portfolio of work to demonstrate a practical understanding of the field

Why Choose this Programme?

Accreditation

The Postgraduate Diploma in Data Science is an accredited qualification awarded by the Data Science Institute and Woolf, a recognised higher education institution approved within the European Higher Education Area. The diploma qualification is recognised at level 7 (postgraduate) and carries 60 ECTS credits on the European Qualifications Framework.



Progression

The credits you earn on the diploma contribute to the Data Science Institute's MSc Data Science. In order to complete the MSc you will undertake a 30 ECTS credit Postgraduate Major Project. Holders of the Postgraduate Diploma in Data Science can transfer their credits to the UK Qualifi Level 7 Diploma in Data Science and also combine their professional experience to achieve the Certified Professional Data Scientist (CPDS) credential.



“Learning from data is virtually universally useful. Master it and you’ll be welcomed nearly everywhere!” – John Elder, Elder Research

Why Choose this Programme?

Industry Advisory Panel

Our Industry Advisory Panel comprises industry domain experts and practitioners, management consultants and academics. The aims of the panel are to ensure that our programme specifications, content and delivery methods are leading edge, industry relevant, academically rigorous and meet international university standards, as well as prepare graduates to be job and business ready.

Our Faculty

With more than 50 years of cumulative experience in data science and advanced analytics our faculty has worked with over fifty clients on more than one hundred projects. In addition, they have delivered multiple corporate training programmes and have regularly contributed academic research papers.

Professional Data Science Framework

This diploma conforms to the **Edison European Data Science Framework**, a Europe-wide project comprising members of leading universities, research institutes and corporations to establish the necessary skills and definitions for data science as a professional practice across Europe.





Programme Delivery

Online Course Content

You are provided with highly structured and detailed course content, broken down into nine distinct modules covering core skills and knowledge through our learning management system. This includes recorded video presentations, comprehensive lecture slides, sample code for practice, quizzes and regular practice assignments based on real world examples.

Communication and Collaboration

You will participate in regular scheduled live online group classes and also have opportunities to interact with course mentors on a one to one basis throughout the course. In addition, you will be able to communicate and collaborate with your course colleagues on an ongoing basis.

Course Duration and Commitment

The Postgraduate Diploma in Data Science can be completed in **6 to 9 months** and is suitable for both full-time and part time studies. You will need to devote your time to studying the course content in depth, attend online group sessions, work with your mentors, carry out tasks and project work and take exams during the course.

Assessment and Projects

The course is assessed by **assignments** and **exam** for each module of the course and **a guided capstone project** based on real-world data and scenarios provides the opportunity to bring together elements of the overall course.



What you'll learn

Module 1 topics

Programming in Python, R and SQL

Data management

Measures of central tendency and variation

Bivariate relationships

Data visualisation

Exploratory Data Analysis

Most industry analysis starts with exploratory data analysis and a thorough study of this will help you to perform data health checks and provide initial business insights. You will gain a sound understanding of Python and R programming, descriptive statistics, data management and data visualisation. You will also learn SQL for big data pre-processing and prepare data for big data analytics. The module serves as an essential foundation for advanced analytics taught later in the course.

Module 2 topics

Principles of statistical inference

Parametric tests

Non-parametric tests

Analysis of variance (ANOVA)

Statistical Inference

Statistical inference is the process of drawing inferences or conclusions from data using statistical techniques. This is at the core of data science, and a strong understanding of statistics from the beginning is the prime ingredient for a competent data scientist. In this module, you will cover sampling, statistical distribution, hypothesis testing, and variance analysis and use R code to carry out various statistical tests and draw inferences from their output.

Module 3 topics

Predictive modelling principles

Linear regression models

Model validation

Python and R packages for predictive modelling

Fundamentals of Predictive Modelling

Solutions to many business problems are related to successfully predicting future outcomes. This module introduces predictive modelling and provides a foundation for more advanced methods and machine learning. You'll gain an understanding of the general approach to predictive modelling and then build simple and multiple linear regression models in Python and R and apply these in a range of contexts.

What you'll learn

Module 4 topics

Logistic regression models

Survival analysis

Cox regression

Poisson regression

Advanced Predictive Modelling

In this module, you are introduced to model development for categorical dependent variables. Binary dependent variables are encountered in many domains such as risk management, marketing and clinical research and this module covers detailed model building processes. Multinomial and ordinal logistic regression are also covered.

Module 5 topics

Time Series concepts

Assessing stationarity

ARIMA, ARCH, GARCH modelling

Panel data regression

Time Series Analysis

In this module, time series forecasting methods are introduced and explored. You will analyse and forecast macroeconomic variables such as GDP and inflation, as well as look at complex financial models using ARCH and GARCH, ARIMA, time series regression, exponential smoothing and other models.

Module 6 topics

Principal Component Analysis

Factor Analysis

Multidimensional Scaling

Cluster Analysis

Unsupervised Multivariate Methods

Data reduction is a key process in data science and you will learn to apply data reduction methods such as principal component analysis, factor analysis and multidimensional scaling. You will also learn to segment and analyse large data sets using clustering methods, another key analytical technique that brings out rich business insight if carried out skillfully.

What you'll learn

Module 7 topics

Machine Learning 1

Naive bayes

Support Vector Machines

K nearest neighbours

Machine learning algorithms are new generation algorithms used in conjunction with classical predictive modelling methods. In this Machine Learning 1 module, you will understand applications of the support vector machine, K nearest neighbours and naive bayes algorithms for classification and regression problems using case studies from a range of industries and sectors.

Module 8 topics

Machine Learning 2

Decision Tree

Random Forest

Association Rules

Neural Networks

The Machine Learning 2 module continues developing your machine learning knowledge and you will cover decision tree, random forest and neural network algorithms for regression and classification, again drawing on case studies from real world data. You will have the opportunity to compare the performance of machine learning algorithms against classical statistical models and learn to assess which are most appropriate for specific scenarios.

Module 9 topics

Text Mining and Natural Language processing

Structured and unstructured data

Text mining in R and Python

Natural language processing

This module looks at analysing unstructured data such as that found social media, newspaper articles, videos and more. In particular you will look at methods for text mining and natural language processing using R and Python code to produce graphical representations of unstructured data and carry out sentiment analysis.



What you'll learn

Data Science in Practice

The Data Science in Practice module provides you with an opportunity to apply knowledge through project work. You will select a project from a specific domain and appropriately apply exploratory data analysis, statistical methods and select appropriate advanced modelling techniques. This module also develops your scientific communication skills through the preparation of project reports and presentations.

Module 10 topics

Presentation and communication skills

Synthesis of data science knowledge

Application to real world data and scenarios

Take the Next Steps

Opportunities

Holders of the Postgraduate Diploma in Data Science will find opportunities in data scientist roles across a wide range of sectors. Data Science and analytics is central to AI, machine learning, robotics and forecasting, and is used across a wide array of industries and professional functions such as those listed below:

| | |
|---------------------------------|---------------------------|
| Academia | Healthcare |
| Aerospace | Human Resources |
| Agriculture | Insurance |
| Banking and Finance | Logistics |
| Big Tech | Manufacturing |
| Cybersecurity | Marketing |
| Education | Medical Technology |
| Engineering | Pharmaceuticals |
| Energy | Sports |
| Environmental management | Telecommunications |
| | Utilities |

Our students and graduates work for technology companies, consulting firms, specialist analytics and marketing consultancies, financial services firms and multinationals, including those in this sample:



DXC.technology



Take the Next Steps

Who should take this course?

The Postgraduate Diploma in Data Science is an advanced qualification designed for graduates with at least a first degree or equivalent in a numerate discipline from a recognised institution. It is suitable for both those wishing to move into data science from other areas and experienced data analysts and data science professionals.

Those who have completed the institute's Postgraduate Certificate in Data Science can transfer their ECTS credits towards the Postgraduate Diploma in Data Science.

Application

Have questions about our Masters in Data Science course? Please email our [admissions team](#) who can help advise on this programme and decide if it is right for you and your learning goals.

To find out more about the course

email: info@datascienceinstitute.net

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