



Brunel
University
London

 **Apprenticeships**


TECH
INDUSTRY
GOLD
Accredited by
Tech Partnership Degrees



**DIGITAL AND
TECHNOLOGY
SOLUTIONS
SPECIALIST
(DATA ANALYTICS)
MASTER'S DEGREE**

APPRENTICESHIP

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partnerships***

*InnovateUK

Welcome from the Dean

It is my pleasure to introduce you to the College of Engineering, Design and Physical Sciences, one of the largest Colleges of its type in the UK, with close to 5000 undergraduate and postgraduate students.

We strive to put creativity and innovation at the heart of everything we do, offering exciting, vocational programmes across a range of integrated disciplines. Our graduates are known for their ability to solve challenging problems, for the good of society, and their entrepreneurial spirit, following in the footsteps of one of Britain's most creative designers and engineers, Isambard Kingdom Brunel.

College vision

Our mission is to deliver a transformative education experience that nurtures talent, encourages creativity and scholarship and fosters lifelong learning through enquiry. Our vision is to be a leading and distinctive STEM education and knowledge provider. Our distinctive programmes will help Brunel University London meet its strategic aims of providing an environment that promotes excellence and prepares graduates ready for the world of work.



**Professor Hua Zhao,
Vice Provost and Dean of College**



Introduction

The Brunel University London Digital and Technology Solutions Specialist (Data Analytics) Master's Degree Apprenticeship will develop the skills, knowledge and behaviours of you or your team to become successful Data Analytics Specialists.

A data analytics specialist investigates business data requirements, and applies data selection, data investigation and engineering techniques. They will help the business to most effectively organise their data and will provide advice and guidance to database designers and other stakeholders. Moreover, data analytics specialists will undertake data processing to produce data sets for study and will perform investigations using techniques including machine learning to reveal new business opportunities. They will also present data and investigation results along with compelling business opportunities reports to senior stakeholders.

Who is this programme for?

This course is subject to approval

Typical job roles which suit this programme include: Big data analyst, data and insight analyst, data science specialist, data management specialist, analytics lead.

Duration

2 years

Level

7

Qualification achieved

MSc Digital and Technology Solutions

Programme Content

Core topics include:

- Quantitative Data Analysis
- Modern Data
- Machine Learning
- Leadership Action Sets
- High Performance Computational Infrastructures
- Ethics and Governance of Digital Systems
- Digital Innovation & Strategy
- Research Project Management
- Data Visualisation

How is this programme delivered?

Apprentices are required to dedicate at least 20% of their working hours studying towards the programme. This includes attendance to lectures, completing assessments, independent study and applying theory into application in the workplace. The 20% requirement usually equates to one day per week, either on campus or from home.



YEAR 1

Quantitative Data Analysis

The aim of the module is to develop knowledge and skills of the quantitative data analysis methods that underpin data science. Apprentices will learn to evaluate the strengths and weaknesses of methods alongside an understanding of how and when to use or combine methods.

Indicative content: Descriptive versus inferential statistics • Multivariate regression models (bivariate, multiple and logistic regression) • Mixed and random effects models (ANOVA, ANCOVA, MANOVA), Experimental Design • Covariance models and graphical models • Practical challenges and issues in quantitative data analysis.

Modern Data

The module is aimed at providing an introduction to data management and exploration. An overview of current industry-standard processes to modern data analysis will be presented. Apprentices will learn to design and plan a predictive analytics project. Basic concepts of data management and retrieval will be discussed. Well-established strategies and approaches to data understanding, data preparation and cleaning will be presented.

Indicative content: Introduction to experimental designed data analysis and secondary data analysis • Data storage and retrieval • Data preparation and cleaning • Bias, imbalance and sensitivity analysis • Exploratory data analysis • Open data and principles of data sharing (findability, accessibility, interoperability, and reusability) • Reproducibility in data analysis

High Performance Computational Infrastructures

The aim of the module is to develop knowledge and skills necessary for working effectively with the large-scale data storage and processing infrastructures that underpin data science. Apprentices will develop both practical skills and an ability to reflect critically on concepts, theory and appropriate use of infrastructures.

Indicative content: Cloud Computing tools for large-scale data storage and processing (e.g., MapReduce, HIVE, PIG) • In-memory storage and processing solutions (e.g. Spark) • Distributed programming for real-world data analysis (e.g. in R, PYTHON)

Machine Learning

The aim of the module is to develop the reflective and practical understanding necessary to extract value and insight from heterogeneous data sets using statistical learning. Focus is placed on the analytic methods/techniques/algorithms for generating value and insight from the processing of heterogeneous data.

Indicative content: Introduction to Exploratory Data Analysis • Unsupervised and supervised learning • Principal Component Analysis • Cluster Analysis • Tree-based predictive models • Ensemble-based predictive models • Support vector machines • Performance evaluation

Leadership Action

Leadership action sets are non-credit, workshop-style activities run over the summer term with the participation of industry leaders. Apprentices will reflect on their leadership skills, which links to the development of their portfolio.

Indicative content: Industry case studies on leadership • Leadership styles • Organisational learning • Building personal leadership qualities • Human factors in technology projects • Leaders as agents of change in organisations

Programme Structure

(course subject to approval)

YEAR 2

Ethics and Governance of Digital Systems

To develop a critical understanding of topics related to the handling and governance of digital information in contemporary systems contexts. Such topics will include the way that networked and intelligent systems are designed and used; the motivations for their adoption; the substantive issues arising; and approaches to their regulation and governance. Examples from the public and private sectors will be used to illustrate these developments.

Indicative content:

Indicative topics of study which may vary in line with emerging trends:

- Concepts of ethical behaviour
- Ways of designing and using digital technologies, such as Internet, social media, open source, artificial intelligence

Substantive issues and concerns related to the handling of digital data, e.g.

- Personal privacy, freedom and identity systems
- Trust, consent and social inclusion in networked and intelligent systems contexts
- Transparency, accountability and risks in decision making and information sharing

Technological and regulatory challenges for government and business, e.g.

- Security, surveillance and associated policies
- Regulatory frameworks, e.g. data protection, freedom of information
- Public engagement, e.g. the role of citizens' assemblies

Digital Innovation and Strategy

The aim of this module is to develop knowledge and skills necessary for the implementation of digital business models and technologies intended to realign an organisation with the changing demands of its business environment (or to capitalise on business opportunities).

Indicative content: Understanding and justifying digital business improvement (the business case) • Digital innovation management from individual and organisational perspectives • Digital innovation management techniques (from planning to execution) • Digital business change methodologies and models • Leadership in organisations

Work-based project

The agreed project will present a typical business task, appropriate for demonstrating the skills and knowledge on the standard.

Synoptic end-point assessment

Apprentices will prepare a project report which is assessed against the standard and undertake a professional discussion with an independent end-point assessor.

YEAR 2

Research Project Management

To develop and deploy the skills necessary to design a scholarly piece of research work to address an identified problem area within the chosen field of study.

Indicative content: Research perspectives in Social and Organisational Studies

- Research Designs and Strategies
- Research Designs specific to ISC research
- Quantitative Methods and Analysis
- Qualitative Methods and Analysis
- Research project Success Factors
- Tasks and techniques of Research Project Management

Data Visualisation

The aim of the module is to develop the reflective and practical understanding necessary to visually present insight drawn from large heterogeneous data sets (e.g., to decision-makers). Content will provide an understanding of human visual perception, data visualisation methods and techniques, dashboard and infographic design. The role of interactivity within the visualisation process will be explored and an emphasis placed on visual storytelling and narrative development.

Indicative content: Visual perception • Representation • Presentation • Interaction

- Understanding requirements
- Design process and best practice
- Infographics
- Dashboards
- Visual Analytics
- Modelling and visualising semantic similarity
- Graph layout algorithms





Knowledge, Skills and Behaviours

Apprenticeships are underpinned by knowledge, skills and behaviours (KSBs) that apprentices will develop in order to be competent in the occupation or job role.

At the end of the programme, apprentices will undertake an end-point assessment to demonstrate their competency against the KSBs. Apprentice's gain KSBs through on and off-the-job training throughout the programme.



Knowledge

The apprentice will know and understand:

How key algorithms and models are applied in developing analytical solutions and how analytical solutions can deliver benefits to organisations.

The relevant organisational and legislative data protection and data security standards that exist and the legal, social and ethical concerns involved in data management and analysis.

The principles of data driven analysis and how to apply these.

The properties of different data storage solutions, and the transmission, processing and analytics of data from an enterprise system perspective.

How relevant data hierarchies or taxonomies are identified and properly documented.

The concepts, tools and techniques for data visualisation.

The strategic importance of technology enabled business processes, and how they are designed and managed to determine a firm's ability to compete effectively.

The role of leadership in contemporary technology based organisations.

How the employer adds value to its clients through the services and/or products they provide.

How to monitor technology related market trends and research.

Technology road-mapping concepts and methods and how to apply them.

The role of learning and talent management in successful business operations.

Inspire and motivate others to deliver excellent technical solutions and outcomes.

Develop and support others in developing an appropriate balance of leadership and technical skills.

Establish high levels of performance in digital and technology solutions activities.

Be results and outcomes driven to achieve high key performance outcomes for digital and technology solutions objectives.

Skills

The apprentice will be able to:

Identify and select the business data that needs to be collected and transitioned from a range of data systems.

Undertake analytical investigations of data to understand the nature, utility and quality of data.

Formulate analysis questions and hypotheses which are answerable given the data available and come to statistically sound conclusions.

Conduct high-quality complex investigations, employing a range of analytical software, statistical modelling and machine learning techniques to make data driven decisions solve live commercial problems.

Document and describe the data architecture and structures using appropriate data modelling tools.

Scope and deliver data analysis projects, in response to business priorities.

Identify, document, review and design complex IT enabled business processes that define a set of activities that will accomplish specific organisational goals.

Design and develop technology roadmaps, implementation strategies and transformation plans focused on digital technologies to achieve improved productivity.

Deliver workplace transformations through planning and implementing technology based business change programmes.

Negotiate and agree digital and technology specialism delivery budgets.

Develop and deliver management level presentations which resonate with senior stakeholders, both business and technical.

Professionally present digital and technology solution specialism plans and solutions in a well-structured business report.

Demonstrate self-direction and originality in solving problems.

Be competent at negotiating and closing techniques in a range of interactions and engagements, both with senior internal and external stakeholders.

Evaluate the significance of human factors to leadership in the effective implementation and management of technology enabled business processes.

Develop own leadership style and professional values that contributes to building high performing teams.

Apply broader technical knowledge combined with an understanding of the business context.

Demonstrate effective technology leadership and change management skills.

Create and implement innovative technological strategies to support the development of new products, processes and services that align with the company's business strategy.

Behaviours

The apprentice will be able to:

Inspire and motivate others to deliver excellent technical solutions and outcomes.

Establish high levels of performance in digital and technology solutions activities.

Be results and outcomes driven to achieve high key performance outcomes for digital and technology solutions objectives.

Develop and support others in developing an appropriate balance of leadership and technical skills.

Create strong positive relationships with team members to produce high performing technical teams.



About Tech Industry Gold Accreditation



- Programmes accredited by Tech Partnership Degrees as Tech Industry Gold meet industry standards for quality, relevance and employer focus.
- Students can choose Tech Industry Gold programmes with confidence, knowing they meet industry standards for quality, relevance and employer focus.
- Tech Industry Gold programmes are defined by industry to integrate the technical, business and interpersonal skills that are most valued by employers.
- Tech Industry Gold programmes are defined by industry to give students the best possible career prospects.
- Major employers are choosing digital degree apprenticeships to attract and retain top digital talent. For more details on the Tech Industry Gold degrees and degree apprenticeships accredited by Tech Partnership Degrees, go to tpdegrees.com

Supporting you

We know that developing a new apprenticeship programme can be daunting, that's why we have support mechanisms in place to support both you and your apprentices throughout every stage of the programme.

Development Manager

Your apprenticeship development manager will act as your key point of contact for all aspects of the apprenticeship programme. They will work with you to ensure the programme will meet the needs of your organisation and ensure that you receive an outstanding level of service throughout.

Academic Tutors

We have over 978 academic staff at the University and they are responsible for advancing our teaching and research programmes. Apprentices will receive expert teaching, learning and assessment to ensure successes throughout the programme.

Practice Tutors

Our practice tutors will work with you to ensure knowledge and understanding is being applied into the workplace. This could be working closely with you to identify workplace projects and activities that will support the apprentice's on-the-job learning.

Functional Skills Partner

All apprentices are required to hold at least Level 2 in English and Mathematics prior to undertaking the final assessment. If apprentices don't already hold these qualifications, we are able to provide workplace teaching and learning to ensure apprentices achieve these qualifications within the first year of the programme.

Tripartite Reviews

Throughout the programme, you and your apprentice will receive regular progress reviews to keep you informed of the progress being made against learning goals and agreeing milestones over the next review period.

Campus life

We are proud of our wonderful London campus, home to a thriving, connected community of students, staff, partners and alumni, embracing diversity and celebrating a culture of mutual respect.

The campus has benefited from £400m of investment in the past decade. That commitment to the best teaching and research facilities is set to continue with several high-profile developments in the pipeline, among them a £50m centre for teaching and learning. Our sports facilities are the finest university facilities in London and our vibrant arts programme brings culture to the campus for staff, students and the local community.

Complementing our new, modern buildings, are our original buildings, many of which are protected by law as fine examples of sixties brutalism. Over the years this unique architecture has made us a popular location for filming TV and movies - everything from *A Clockwork Orange* to *The Sweeney*, *Inspector Morse*, *Silent Witness* and *Spooks*.

We have a Met police-trained security team on campus 24 hours a day, seven days a week to look after our students and staff.

Brunel is officially one of the best green spaces in the country, having received the Green Flag Award in 2019 for the third year running.

Library

The Library is at the heart of the campus. It is open 24 hours a day during term-time, providing more than 300,000 printed books, plus anytime, anywhere access to over 600,000 eBooks, 100,000 eJournals, databases and datasets.

Computer Centre

Access to wi-fi across campus and in halls of residence, Microsoft Office, 24-hour PC labs and a network email account.

The Computer Centre can help with any internet connectivity issues, logging onto the intranet, resolving network issues or accessing your Brunel network account.

Student Centre

The Student Centre provides a range of administrative services and support to all students. The Student Centre is the first port of call for any administrative enquiries including registration, finance, student letters, visa applications and much more.

ASK: Academic Skills service

The Academic Skills service specialises in teaching all Brunel students the skills needed to learn independently and thrive academically, whatever their level or subject.



Find out how Brunel apprenticeships can support your business.

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