

BSC (HONS) (DATA SCIENCE AND ANALYTICS)

Overview

NFQ Level 8, Major Award

This is a four year honours degree programme delivered jointly by the School of Computer Science and the School of Mathematical Sciences. This programme includes a six-month work placement/project (CS3220 Work Placement DSA) in Third Year.

First Year - Data Science and Analytics

To be admitted to the First University Examination in Data Science and Analytics a student must have satisfactorily attended modules amounting to **60** credits comprising core modules to the value of **55** credits, and elective modules to the value of **5** credits.

Second Year - Data Science and Analytics

To be admitted to the Second University Examination in Data Science and Analytics a student must have satisfactorily attended modules amounting to **60** credits comprising core modules to the value of **55** credits, and elective modules to the value of **5** credits.

Third Year - Data Science and Analytics

To be admitted to the Third University Examination in Data Science and Analytics a student must have satisfactorily attended modules amounting to **60** credits.

Fourth Year - Data Science and Analytics

To be admitted to the Fourth University Examination in Data Science and Analytics a student must have satisfactorily attended modules to the value of **60** credits comprising core modules to the value of **45** credits, and elective modules to the value of **15** credits.

Programme Requirements

For information about modules, module choice, options and credit weightings, please go to Programme Requirements (p. 1).

Programme Requirements

Code	Title	Credits
Year 1		
Students take 60 credits as follows – all listed core modules (55 credits) and 5 credits of elective modules:		
<i>Core Modules</i>		
CS1106	Introduction to Relational Databases	5
CS1112	Foundations of Computer Science I	5
CS1113	Foundations of Computer Science II	5
CS1117	Introduction to Programming	15
AM1054	Mathematical Software	5
MA1058	Introduction to Linear Algebra	5
MA1059	Calculus	5
ST1050	Statistical Programming in R	5
ST1051	Introduction to Probability and Statistics	5
<i>Elective Modules</i>		
Students take modules to the value of 5 credits from the following:		
AM1053	Introduction to Mathematical Modelling	5

or ST1401 Introduction to Operations Research

Year 2

Students take **60** credits as follows – all listed core modules (**55** credits) and **5** credits of elective modules:

Core Modules

CS2208	Information Storage and Management I	5
CS2209	Information Storage and Management II	5
CS2513	Intermediate Programming	5
CS2514	Introduction to Java	5
CS2515	Algorithms and Data Structures I	5
CS2516	Algorithms and Data Structures II	5
MA2055	Linear Algebra	5
MA2071	Multivariable Calculus	5
ST2053	Introduction to Regression Analysis	5
ST2054	Probability and Mathematical Statistics	10

Elective Modules

Students take modules to the value of **5** credits from the following:

AM2052	Mathematical Modelling	5
or ST2402	Modelling and Systems for Decision Making	

Year 3

Students take **60** credits as follows:

Core Modules

CS3204	Cloud Infrastructure and Services	5
CS3205	Data Visualization for Analytics Applications	5
CS3220	Work Placement DSA	10
CS3306	Workplace Technology and Skills	10
CS3318	Advanced Programming with Java	5
CS3509	Theory of Computation	5
ST3053	Stochastic Modelling I	5
ST3061	Statistical Theory of Estimation	5
ST3069	Generalised Linear Models	5
ST3070	Statistical Theory of Hypothesis Testing	5

Year 4

Students take **60** credits as follows – all listed core modules (**45** credits) and **15** credits of elective modules:

Core Modules

CS4701	Analytics Project for Computer Science	15
or ST4092	Data Analytics Project	
CS4704	Algorithms and Data Structures for Analytics	5
CS4705	Computational Machine Learning	5
ST4060	Statistical Methods for Machine Learning I	5
ST4061	Statistical Methods for Machine Learning II	5
ST4069	Multivariate Methods for Data Analysis	10

Elective Modules

Students take modules to the value of **15** credits from the following:

AM2061	Computer Modelling and Numerical Techniques ()	
AM3064	Computational Techniques ()	
CS4150	Principles of Compilation ()	
CS4405	Multimedia Compression and Delivery ()	
CS4407	Algorithm Analysis ()	
CS4614	Introductory Network Security ()	
CS4615	Computer Systems Security ()	

CS4620	Functional Programming I ()
CS4626	Constraint Programming and Optimisation ()
ST3054	Survival Analysis ()
ST4064	Time Series ()
Total Credits	240

Examinations

Full details and regulations governing Examinations for each programme will be contained in the *Marks and Standards Book* and for each module in the *Book of Modules*.

Programme Learning Outcomes

Programme Learning Outcomes for BSc (Hons) (Data Science and Analytics) (NFQ Level 8, Major Award)

On successful completion of this programme, students should be able to:

- Analyse problems of a computational and/or quantitative nature, encountered in a range of types of large-scale data, and construct solutions to such problems using the tools and skills of modern data analytics, including the use of machine learning, statistical and mathematical computer packages, and the use of database programmes;
- Describe the fundamental theories, models and principles of statistical methods, and carry out a wide range of calculations involved in statistical decision making, modelling, hypothesis generation and inference;
- Describe the fundamental theories, models and principles of computational methods for storing, processing and performing inference on large data sets; examples include machine learning, data mining and probabilistic methods;
- Manage large amounts of data using modern database tools, and understand the management implications of hardware, software and bandwidth constraints;
- Apply data management tools to data sets from a range of application domains, such as biology, business, and science, in order to gain exposure to working with different types of data;
- Analyse data selected from a range of domains such as insurance, bio-informatics, marketing, social networking, finance, fraud detection, and drug discovery;
- Perform computational/statistical analyses and create visualizations to aid in understanding heterogeneous data;
- Summarize and communicate computational and statistical models and techniques, and be able to visualise this information in order to best present such summaries to technical and non-technical audiences;
- Apply visualisation and summarization techniques to application domains, to demonstrate ability to highlight outcomes from different types of data with respect to different objectives (e.g., profit-making vs. health-outcomes);
- Develop skills in analytical fields, with the ability to significantly contribute in a broad range of industries (and moreover to society as a whole) in using skills and education to identify, assess, manage and quantify key findings (e.g., trends, risk, uncertainty) in various situations;
- Work independently on a research project, collating, analysing and reporting on the findings with the capacity to present the results to a broad audience.