Programme Specification

A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from The University of Sheffield

Programme Details

1. Programme title	Data Science
2. Programme code	INFU06
3. QAA FHEQ level	Level 6
4. Faculty	Social Sciences
5. Department	Information School
6. Other departments providing credit bearing modules for the programme	Not applicable
7. Accrediting Professional or Statutory Body	Not applicable
8. Date of production/revision	November 2021, September 2024

Awards	Type of award	Duration
9. Final award	Bachelor of Science with Honours (BSc Hons)	3 years full-time
10. Intermediate awards	Not applicable	

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	*I900: Others in Computer Sciences*	*I260: Data Management*	
12. HECoS code(s) S*elect between one and three codes from the HECoS vocabulary.*	*100755 - Data Management - 50%*	*100366 - Computer Science - 50%*	

Programme Delivery

13. Mode of study	Full-time
14. Mode of delivery	Taught, face-to-face

15. Background to the programme and subject area

This BSc Data Science has two strong themes which differentiate it from other Data Science degrees. These themes are data translation and responsible data science. They capitalise on the extensive multidisciplinary expertise and real-world experience of the iSchools network to improve data science as a discipline and on our own expertise in FATES (Fairness, Accountability, Transparency, Ethics and Security), social justice and sustainable futures.

Data Translators

There is increasing evidence that data scientists need to be better equipped to ask the right questions, draw on theory and skills from a variety of disciplines, and implement a critical and reflective decision-making framework to apply technical data science skills in organisational and societal contexts. These skills align with the emergence of a new role within the data profession sometimes labelled a "Data Translator". A Data Translator is someone who can bridge the gap in expertise between employees with more technical-analytical-infrastructure roles on the one hand, and the business stakeholders on the other.

BSc Data Science will help build a new generation of data translators who are able to bring data skills, organisational experience and social, ethical and ecological awareness to the context of big business, start-ups, social enterprises, sustainable development and the third sector.

Responsible Data Science

Most UK undergraduate data science-related degrees emphasise technical skills such as statistics, predictive modelling and big data analysis. They teach what they view as day-to-day technical aspects, such as developing and implementing the supporting infrastructures and performing regular data analysis activities. Organisational and societal contexts of data applications are taught tendentially. Consequently, data science graduates are often coding algorithms without an understanding of their real-world implications. Responsible data science is a key USP of BSc Data Science, with emphasis on:

- *Data for good and the embedding of FATES principles in Data Science and Artificial Intelligence.*
- *Understanding the contexts in which data science techniques are applied.*
- *The development of data science techniques that promote a sustainable future.*
- *The potential of Artificial Intelligence applications to contribute to biases that perpetuate social inequalities.*

16. Programme aims

BSc Data Science aims to:	
A1	Equip students with the capabilities to work at the boundary between data science roles and managerial or policy-making roles.
A2	Equip students with the attributes and understandings needed to develop and use data-informed solutions which address social inequalities and promote sustainable futures and inclusivity.

A3	Equip students with the data, information and analytical literacies to enable them to become critical data professionals, evidence-based practitioners and successful lifelong learners.
A4	Equip students with the competencies to apply data science and Artificial Intelligence (AI) principles in order to derive insight, communicate findings and support proactive decision-making for responsible outcomes.
A5	Provide students with the competencies needed to effectively use industry-standard processes and innovative techniques within the data lifecycle and Artificial Intelligence (AI) applications.

17. Programme learning outcomes

Knowledge and understanding

On successful completion of the programme, students will be able to:

		Links to Aim(s)
K1	Describe the conceptual underpinnings of data science, their development as fields of study, and the cultural, social, political and historical contexts within which they are embedded locally, nationally and globally.	A4
K2	Explain how data science techniques are applied in Artificial Intelligence (AI) and demonstrate an understanding of the associated issues (e.g. bias and human autonomy).	A2, A3, A4, A5
K3	Evaluate and synthesise issues concerning equity and inclusion in the context of data-related practices – and those affected by them.	A2, A3
K4	Understand how data governance (including data stewardship), effective leadership and strategic thinking can contribute to responsible data-related services and policies.	A1, A4
K5	Explain how to identify the priorities of key stakeholders in organisations and other contexts and communicate persuasively the value that data science and Artificial Intelligence (AI) have for creating effective and responsible outputs and insights.	A1, A4
K6	Demonstrate an understanding of the processes of public policy making organisational strategy and commercial awareness to ensure data science insights and Artificial Intelligence (AI) are used effectively and responsibly.	A1, A3

Skills and other attributes

On successful completion of the programme, students will be able to:

S1	Understand how data (including 'big data') are obtained and created, and how this shapes its appropriateness for future use.	A5
S2	Critique and develop data science - including its experiments, related practices, processes, instruments, systems and infrastructures - and evaluate specific approaches empirically and ethically.	A3, A5
S3	Create and implement appropriate data science methods to discover relations, make useful predictions and deliver insights, applying criticality to assure approaches are appropriate to specific contexts.	A5

S4	Analyse and critically evaluate a wide range of real-life problem-contexts from a data science perspective that incorporates ethics, sustainability, impact and the dissemination of the benefits or knowledge to wider society.	A2, A3
S5	Demonstrate digital and data fluency in the application of appropriate visualisation and statistical methods in order to describe, explore, analyse and present data for different audiences and stakeholders.	A1, A5
S6	Confidently, appropriately, effectively and persuasively communicate findings, insights, ideas and issues in order to lead, inform or inspire different audiences/stakeholders, including by means of data visualisations.	A1, A4
S7	Develop the interpersonal skills needed to effectively collaborate with others in order to create responsible data solutions.	A1

18. Learning and teaching methods

1. The programme is underpinned by an inquiry-based pedagogy: one which provides rich and varied opportunities for students to apply data science to real world problems (K1-K6, S1-S7).

2. Supporting the programme's inquiry-based pedagogy are the more traditional learning teaching methods (e.g lectures, seminars, workshops and computer laboratories) and a strong emphasis on digital education including 'flipped classrooms' and the use of online communication tools (K1-K6, S1-S7).

3. The more technical aspects of the programme will use teaching and learning methods inspired by successful industry approaches including peer instruction, live coding and paired programming (K6, S5, S7).

4. Students are supported to become self-directed learners by incorporating tasks which promote reflection, information literacy and team working (K1-K6, S1-S7).

5. Alongside an annual industry day, Industry case studies and industry-related inquiries enhance students' employability and contextualise learning (K1-K6, S1-S7).

19. Assessment and feedback methods

Assessment

1. A diverse and balanced range of formative and summative assessment types will be provided to cater for students' different learning preferences, styles and circumstances (K1-K6, S1-S7).

2. Formative assessment types include weekly quizzes, interim submissions, personal portfolios, team challenges and group presentations (K1-K6, S1-S7).

3. Summative assessment types include individual reports, individual essays, individual e-portfolios, invigilated exams, team produced videos, group presentations and group posters (K1-K6, S1-S7).

Feedback

1. A diverse and balanced range of formative and summative feedback types will be provided to cater for students' different learning preferences, styles and circumstances (K1-K6, S1-S7).

2. Formative feedback types include immediate grades from weekly quizzes, written feedback from interim submissions, verbal feedback after team challenges and peer feedback during inquiries (K1-K6, S1-S7).

3. Summative feedback types primarily include Turnitin text comments and rubric grades (K1-K6, S1-S7).

4. The Information School's Teaching Support Team has mechanisms to monitor and report the timeliness of module teams' summative feedback to students.

20. Programme structure and student development

Level 1 is foundational and all modules are core. Students will develop the data science, professional and academic capabilities, grounded in reflective, and applied approaches, to be successful in Level 2, Level 3 and beyond. The Data Science Foundations and Contexts 40 credit module spans Semester 1 and 2 providing an academic and pastoral anchor point to students' studies.

At Level 2 all modules are core. Students apply and develop many of the foundational capabilities and understandings gained at Level 1 to the context of a data lifecycle and a team-based project. The Responsible Data Science Lab (1) 40 credit module spans Semester 1 and 2, consolidating, developing and applying the competencies and understandings acquired in the other Level 2 modules.

At Level 3 all modules are core. Modules primarily provide opportunities to apply the capabilities gained at Level 1 and Level 2 to support students' career aspirations/specialisms. Responsible Data Science Lab (2) is an inquiry-based capstone 40 credit module for S1 to S7. It consolidates, develops and applies the skills acquired in the other Level 1, 2 and 3 modules. The Data Science Portfolio is a capstone 20 credit module for K1 to K6. It consolidates, develops and applies the knowledge acquired in the other Level 1, 2 and 3 modules. Becoming a Data Translator is a capstone 20 credit module for S1 to S7, in which students consolidate and reflect on their learning in becoming the "Data Translator" role which frames the programme.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at http://www.sheffield.ac.uk/calendar

21. Criteria for admission to the programme

Detailed entry criteria are yet to be agreed with Admissions colleagues, but we anticipate that we will expect ABB or equivalent as a standard entry point, with a reduction of one grade or two grades for WP candidates as assessed by Admissions. We will also welcome applications from those with non-traditional qualifications and/or with significant workplace experience and will consider these applications individually. We are working with colleagues in the Department for Lifelong Learning to introduce a Foundation Year pathway for mature students.

22. Reference points

The learning outcomes have been developed to reflect the following points of reference:

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2024)
https://www.qaa.ac.uk/the-quality-code/qualifications-frameworks#

University Vision
https://www.sheffield.ac.uk/vision

Education pillar
https://www.sheffield.ac.uk/vision/our-pillars/education

Subject specific reference points (Details can be found here):

QAA (computing)

QAA (Business and management)

CILIP

Data Science Competencies

ACM/IEEE

National Academies Press Undergraduate Data Science

23. Additional information

None

This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at http://www.shef.ac.uk/ssid.