INTERNATIONAL QUALIFICATIONS

AND ASSESSMENT CENTRE (IQAC)

«Approved»

2025 y. «16»

Programme	LEVEL 4 EXTENDED DIPLOMA IN DATA SCIENCE		
Unit Number/ Unit Title	UNIT 3 INTRODUCTION TO DATA SCIENCE		
Cohort Code:	L04IDS-U3		
Unit Level	Level 4		
Total GLH	Total qualification time 200/ Total Guided learning hours 90/ Self-guided learning hours 110		
Credits	20 CATS/ 10 ECTS		
Lecturer			
Start Date		**End Date**	

Unit Aims	This module introduces the fundamental concepts and techniques of data science, providing students with a broad understanding of the field.
Differentiation Strategies *(e.g. planned activities or support for individual learners according to their needs)*	The total number of students to be in the lesson is approximately 20. This is a multicultural group of students predominantly between the ages of 24 – 45, with numerous ethnic, gender, and creed background. These are UK academic level 5 students; hence it is assumed that they have practical, theoretical, or technological knowledge and understanding of a subject or field of work to find ways forward in broadly defined, complex contexts. These students must be able to generate information, evaluate, synthesise the use information from a variety of sources. Various approaches to addressing the various identified students needs will be adopted throughout the lesson. Such will include:- 1. Progressive tasks 2. Digital resources 3. Verbal support 4. Variable outcomes 5. Collaborative learning

	6. Ongoing assessment 7. Flexible-pace learning
Equality & Diversity	Variety of teaching techniques will be employed to ensure that the needs of each individual learner are met.
Safeguarding & Prevent	Safeguarding policies and the Prevent duty are strictly observed to ensure the safety, well-being, and inclusivity of all students and staff.
Health & Safety	SIRM H&S policies will be maintained.
Learning Resources	**Teaching and Learning Materials** • Provost, F., & Fawcett, T. (2013). Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. O'Reilly Media. • Grus, J. (2019). Data Science from Scratch: First Principles with Python. O'Reilly Media. • McKinney, W. (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. O'Reilly Media.

Learning Outcome	Assessment Criteria
LO1 Understand the basics of data science.	1.1: Explain key concepts, terminologies, and principles of data science. 1.2: Identify common data science tasks and methodologies.
LO2 Develop skills in data analysis and visualization.	2.1 Perform basic data analysis using statistical tools. 2.2 Create visualizations to represent data effectively.
LO3 Apply data science techniques to real world problems.	3.1 Analyze case studies to identify data science solutions. 3.2 Implement data science techniques to address practical problems.

No	Learning Outcome / Topic	Learning and Teaching Activities	Which assessment criteria does the session relate to?	Day/month/year/ signature
1.	**What is Data Science?**	**What is Data Science?** Definition, history, and the data science lifecycle	LO1: Foundations of Data Science	
2.	**Key Terminologies**	**Key Terminologies** Structured vs. unstructured data, features, labels, big data	LO1: Foundations of Data Science	
3.	**Data Science Methodologies**	**Data Science Methodologies** CRISP-DM, OSEMN (Obtain, Scrub, Explore, Model, Interpret)	LO1: Foundations of Data Science	
4.	**Roles in Data Science**	**Roles in Data Science** Data engineers, analysts, scientists, and ML engineers	LO1: Foundations of Data Science	
5.	**Ethics in Data Science**	**Ethics in Data Science** Privacy, bias, and responsible AI	LO1: Foundations of Data Science	
6.	**Types of Data**	**Types of Data** Numerical, categorical, time-series, text	LO2: Data Analysis & Visualization	
7.	**Descriptive Statistics**	**Descriptive Statistics** Mean, median, variance, percentiles	LO2: Data Analysis & Visualization	
8.	Half-Term Exam	- Review of LO1 topics - Practice questions and mock assessment - **Half-term assessment** based on LO1 (theory)	LO1 LO2	
9.	**Exploratory Data Analysis (EDA)**	**Exploratory Data Analysis (EDA)** Pandas profiling, summary statistics	LO2: Data Analysis & Visualization	
10.	**Data Cleaning Techniques**	**Data Cleaning Techniques** Handling missing values, outliers, duplicates	LO2: Data Analysis & Visualization	

11.	**Data Visualization Principles**	**Data Visualization Principles** Choosing the right chart, avoiding misleading visuals	LO2: Data Analysis & Visualization	
12.	**Python for Data Science**	**Python for Data Science** Introduction to Pandas, NumPy, and Jupyter Notebooks	LO3: Tools for Data Science	
13.	**SQL Basics**	**SQL Basics** SELECT queries, filtering, aggregation (GROUP BY)	LO3: Tools for Data Science	
14.	Final Exam Preparation & Review	- Comprehensive review of all learning outcomes - Practice questions and revision of key topics		
15.	Final Exam	- **Final-term assessment** covering all learning outcomes (theory and practical elements)		
16.	Feedback & Reflection	- Review of final exam - Individual feedback on performance - Reflective discussion on key learning points		
17.	**Data Wrangling with Pandas**	**Data Wrangling with Pandas** Merging datasets, reshaping data (pivot/melt)	LO3: Tools for Data Science	
18.	**Introduction to R**	**Introduction to R** Comparison with Python, basic R syntax	LO3: Tools for Data Science	
19.	**Version Control with Git**	**Version Control with Git** Basics of Git/GitHub for collaborative projects	LO3: Tools for Data Science	
20.	**Matplotlib & Seaborn**	**Matplotlib & Seaborn** Line plots, bar charts, histograms	LO4: Data Visualization Techniques	
21.	**Advanced Visualizations**	**Advanced Visualizations** Box plots, heatmaps, pair plots	LO4: Data Visualization Techniques	

22.	**Interactive Visualizations**	**Interactive Visualizations** Introduction to Plotly and Dash	LO4: Data Visualization Techniques	
23.	Half-Term Exam	**Capstone Project** End-to-end analysis of a real-world dataset		
24.	**Storytelling with Data**	**Storytelling with Data** Designing dashboards, narrative techniques	LO4: Data Visualization Techniques	
25.	**Visualization Best Practices**	**Visualization Best Practices** Color theory, accessibility, and effective labeling	LO4: Data Visualization Techniques	
26.	**Case Study: Retail Analytics**	**Case Study: Retail Analytics** Customer segmentation, sales forecasting	LO5: Real-World Applications	
27.	**Case Study: Healthcare**	**Case Study: Healthcare** Predictive modeling for patient outcomes	LO5: Real-World Applications	
28.	**Case Study: Social Media**	**Case Study: Social Media** Sentiment analysis, trend detection	LO5: Real-World Applications	
29.	Final Exam Preparation & Review	LO1, LO2, LO3, LO4	LO1, LO2, LO3, LO4	
30.	Final Exam		LO1, LO2, LO3, LO4	