INTERNATIONAL QUALIFICATIONS

AND ASSESSMENT CENTRE (IQAC)

«Approved»

2025 y. «16» cyul

Programme	**Level 7 Diploma in Data Science**		
Unit Number/ Unit Title	UNIT 6 RESEARCH PROJECT / MASTER'S THESIS		
Cohort Code:	L07RPMD-U6		
Unit Level	Level 7		
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 capstone module enables students to independently plan, conduct, and present an original research project in the field of data science. Through critical inquiry and methodological rigour, learners will demonstrate their ability to solve complex problems, apply theoretical knowledge, and contribute to the academic or professional community.
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** • Creswell, J. W. (2021). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. SAGE. • Zikmund, W. G. et al. (2013). Business Research Methods. Cengage Learning. • Saunders, M., Lewis, P., & Thornhill, A. (2019). Research Methods for Business Students. Pearson. • Silverman, D. (2020). Doing Qualitative Research. SAGE.

Learning Outcome	Assessment Criteria
LO1. Define a viable research problem and formulate objectives.	**Proposal**: 1.1 Identify a research gap in data science. 1.2 Justify aims, objectives, and significance.
LO2. Conduct a literature review and design research methodology.	**Interim Report**: 2.1 Review academic and industry literature. 2.2 Justify data collection and analysis methods.
LO3. Execute data analysis and interpret findings.	**Final Thesis**: 3.1 Present detailed findings supported by evidence. 3.2 Evaluate results against research questions.
LO4. Demonstrate critical reflection and scholarly writing.	**Final Thesis**: 4.1 Structure argument logically with academic rigor. 4.2 Reflect on limitations and future research directions.

No	Learning Outcome / Topic	Learning and Teaching Activities	Which assessment criteria does the session relate to?	Day/month/year/ signature
1.	**Identifying Research Gaps**	**Identifying Research Gaps** Systematic literature reviews, benchmarking industry needs	LO1: Research Problem Definition	
2.	**Formulating Research Questions**	**Formulating Research Questions** SMART criteria (Specific, Measurable, Achievable, Relevant, Time-bound)	LO1: Research Problem Definition	
3.	**Thesis Objectives & Hypotheses**	**Thesis Objectives & Hypotheses** Aligning with theoretical/practical contributions	LO1: Research Problem Definition	
4.	**Ethical Considerations**	**Ethical Considerations** IRB approval, data privacy, bias mitigation	LO1: Research Problem Definition	
5.	**Proposal Writing**	**Proposal Writing** Structure: Problem statement, literature gap, methodology	LO1: Research Problem Definition	
6.	**Academic Literature Search Strategies**	**Academic Literature Search Strategies** Boolean operators, citation chaining (Google Scholar, Scopus)	LO2: Literature Review & Methodology	
7.	**Critical Appraisal of Sources**	**Critical Appraisal of Sources** Assessing credibility, relevance, and bias in papers	LO2: Literature Review & Methodology	
8.	Half-Term Exam	- Review of LO1 topics - Practice questions and mock assessment - **Half-term assessment** based on LO1 (theory)	LO1 LO2	

9.	**Theoretical Frameworks**	**Theoretical Frameworks** Selecting models (e.g., CRISP-DM for data science projects)	LO2: Literature Review & Methodology	
10.	**Research Design**	**Research Design** Quantitative (experimental, surveys) vs. qualitative (case studies)	LO2: Literature Review & Methodology	
11.	**Data Collection Methods**	**Data Collection Methods** APIs, web scraping, public datasets (Kaggle, UCI)	LO2: Literature Review & Methodology	
12.	**Exploratory Data Analysis (EDA)**	**Exploratory Data Analysis (EDA)** Statistical summaries, visualizations (Matplotlib, Seaborn)	LO3: Data Analysis & Interpretation	
13.	**Machine Learning Pipelines**	**Machine Learning Pipelines** Feature engineering, model selection, hyperparameter tuning	LO3: Data Analysis & Interpretation	
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.	**Statistical Validation**	**Statistical Validation** p-values, confidence intervals, effect sizes	LO3: Data Analysis & Interpretation	
18.	**Interpreting Results**	**Interpreting Results** Aligning findings with research questions	LO3: Data Analysis & Interpretation	

19.	**Visualizing Insights**	**Visualizing Insights** Interactive dashboards (Plotly, Tableau), academic graphs	LO3: Data Analysis & Interpretation	
20.	**Thesis Structure**	**Thesis Structure** IMRaD format (Introduction, Methods, Results, Discussion)	LO4: Scholarly Writing & Reflection	
21.	**Academic Writing Style**	**Academic Writing Style** Clarity, precision, avoiding plagiarism (Turnitin)	LO4: Scholarly Writing & Reflection	
22.	**Referencing & Citations**	**Referencing & Citations** APA/MLA/IEEE standards, Zotero/Mendeley	LO4: Scholarly Writing & Reflection	
23.	Half-Term Exam	**Thesis Formatting** University guidelines, LaTeX/Word templates		
24.	**Limitations & Future Work**	**Limitations & Future Work** Honest assessment of constraints, proposed extensions	LO4: Scholarly Writing & Reflection	
25.	**Peer Review & Revisions**	**Peer Review & Revisions** Incorporating feedback, iterative improvements	LO4: Scholarly Writing & Reflection	
26.	**Preparing for Defense**	**Preparing for Defense** Anticipating questions, slide design (Canva, Beamer)	LO5: Finalization & Defense	
27.	**Research Impact Statement**	**Research Impact Statement** Practical applications, policy recommendations	LO5: Finalization & Defense	
28.	**Submission & Reflection**	**Submission & Reflection** Lessons learned, skills gained, career applications	LO5: Finalization & Defense	
29.	Final Exam Preparation & Review	LO1, LO2, LO3, LO4	LO1, LO2, LO3, LO4	
30.	Final Exam		LO1, LO2, LO3, LO4	