INTERNATIONAL QUALIFICATIONS

AND ASSESSMENT CENTRE (IQAC)

«Approved»

2025 y. «16» 04

Programme	Level 7 Diploma in Artificial Intelligence		
Unit Number/ Unit Title	UNIT 6 RESEARCH PROJECT / MASTER'S THESIS		
Cohort Code:	L07RPMT-U6		
Unit Level	7		
Total GLH	Total qualification time 200/ Total Guided learning hours 90/ Self-guided learning hours 110		
Credits	10 CATS/ 5 ECTS		
Lecturer			
Start Date		**End Date**	

Unit Aims	This module allows learners to demonstrate the ability to plan, design, and execute an independent and original research project in the field of Artificial Intelligence. It enables students to apply theoretical knowledge, research methodologies, and practical skills to explore a specific AI challenge, innovation, or societal issue.
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., & Creswell, J. D. (2017). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications. • Saunders, M., Lewis, P., & Thornhill, A. (2019). Research Methods for Business Students. Pearson Education. • Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach. Pearson. • Yin, R. K. (2018). Case Study Research and Applications. Sage Publications. • Zikmund, W. G., et al. (2012). Business Research Methods. Cengage Learning.

Learning Outcome	Assessment Criteria
1. Identify and justify a significant research problem in AI.	Research Proposal: Formulate a clear and feasible research question. Conduct a literature review and justify the research scope.
2. Apply appropriate research design and methodology.	Methodology Chapter: Choose appropriate data collection and analysis methods. Justify ethical considerations and limitations.
3. Critically analyse data and interpret findings.	Data Analysis: Apply statistical/ML techniques to real data. Interpret results in context of research aims.
4. Present coherent and evidence-based conclusions.	Thesis Report: Structure the thesis logically and clearly. Discuss implications and suggest areas for future research.
5. Demonstrate academic integrity, referencing, and project management.	Full Submission & Viva: Manage time, tasks, and reporting milestones. Use proper referencing and respond to viva questions.

No	Learning Outcome / Topic	Learning and Teaching Activities	Which assessment criteria does the session relate to?	Day/month/year/ signature
1.	**Selecting a Research Topic in AI**	**Selecting a Research Topic in AI** Aligning with academic trends, industry gaps, and personal expertise	LO1: Research Problem Identification	
2.	**Formulating a Research Question**	**Formulating a Research Question** SMART criteria (Specific, Measurable, Achievable, Relevant, Time-bound)	LO1: Research Problem Identification	
3.	**Literature Review Strategies**	**Literature Review Strategies** Systematic reviews, meta-analyses, identifying key papers (Google Scholar, arXiv)	LO1: Research Problem Identification	
4.	**Gap Analysis & Justification**	**Gap Analysis & Justification** Critiquing existing work, highlighting novelty	LO1: Research Problem Identification	
5.	**Research Proposal Writing**	**Research Proposal Writing** Structure (problem statement, objectives, methodology outline)	LO1: Research Problem Identification	
6.	**Research Paradigms in AI**	**Research Paradigms in AI** Quantitative vs. qualitative vs. mixed methods	LO2: Research Design & Methodology	
7.	**Data Collection Methods**	**Data Collection Methods** Surveys, experiments, public datasets (Kaggle, UCI), web scraping ethics	LO2: Research Design & Methodology	
8.	Half-Term Exam	- Review of LO1 topics - Practice questions and mock assessment - **Half-term assessment** based on LO1 (theory)	LO1 LO2	
9.	**Experimental Design**	**Experimental Design** Control groups, variables, reproducibility (MLflow, Weights & Biases)	LO2: Research Design & Methodology	
10.	**AI-Specific Methodologies**	**AI-Specific Methodologies** CRISP-DM for ML, Turing testing for generative AI	LO2: Research Design & Methodology	
11.	**Ethical Approvals & Compliance**	**Ethical Approvals & Compliance** IRB protocols, GDPR/CCPA for data, bias mitigation plans	LO2: Research Design & Methodology	

12.	**Data Preprocessing**	**Data Preprocessing** Cleaning, normalization, feature engineering	LO3: Data Analysis & Interpretation	
13.	**Statistical Analysis Techniques**	**Statistical Analysis Techniques** Hypothesis testing (p-values), regression analysis	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.	**Machine Learning Model Selection**	**Machine Learning Model Selection** Baselines, SOTA comparisons, hyperparameter tuning	LO3: Data Analysis & Interpretation	
18.	**Interpretability Tools**	**Interpretability Tools** SHAP, LIME, attention visualization for deep learning	LO3: Data Analysis & Interpretation	
19.	**Result Validation**	**Result Validation** Cross-validation, ablation studies, adversarial testing	LO3: Data Analysis & Interpretation	
20.	**Thesis Structure**	**Thesis Structure** IMRaD format (Introduction, Methods, Results, Discussion)	LO4: Thesis Writing & Conclusion	
21.	**Writing the Literature Review**	**Writing the Literature Review** Thematic organization, critical synthesis	LO4: Thesis Writing & Conclusion	
22.	**Presenting Results Effectively**	**Presenting Results Effectively** Tables, graphs (Matplotlib, Seaborn), academic style	LO4: Thesis Writing & Conclusion	
23.	Half-Term Exam	**Final Submission & Dissemination** Publishing preprints (arXiv), conference submissions		
24.	**Discussion & Implications**	**Discussion & Implications** Connecting results to research question, societal impact	LO4: Thesis Writing & Conclusion	
25.	**Future Work Recommendations**	**Future Work Recommendations** Unanswered questions, scalability, interdisciplinary extensions	LO4: Thesis Writing & Conclusion	

26.	**Time Management Strategies**	**Time Management Strategies** Gantt charts, Agile for research (2-week sprints)	LO5: Project Management & Defense	
27.	**Referencing & Academic Integrity**	**Referencing & Academic Integrity** Zotero/Mendeley, citation styles (APA, IEEE), plagiarism checks	LO5: Project Management & Defense	
28.	**Drafting & Peer Review** **Preparing for the Viva**	**Drafting & Peer Review** Iterative writing, supervisor feedback cycles **Preparing for the Viva** Mock defenses, anticipating committee questions	LO5: Project Management & Defense	
29.	Final Exam Preparation & Review	LO1, LO2, LO3, LO4	LO1, LO2, LO3, LO4	
30.	Final Exam		LO1, LO2, LO3, LO4	