For exams January, May and November onwards
For teaching from September 2025 onwards

SPECIFICATION

Learning Resource Network

INTERNATIONAL AS AND A-LEVEL

ARTIFICIAL INTELLIGENCE [7933]

Contents

BACKGROUND TO LRN

Learning Resource Network (LRN) is a recognised Awarding Organisation that offers a range of qualifications to candidates, educational institutes, training providers, schools and employers.

LRN is recognised for its high quality qualifications that enable candidates to progress to other areas of study and employment in their designated fields.

In producing its qualifications, LRN uses the experience and expertise of academics, professionals working in the pertinent industries and assessment practitioners with a wealth of best practice and knowledge of validation, verification, delivery and assessment.

MANAGEMENT SYSTEMS

LRN has been awarded international accreditation as part of its quality controls, policies, systems and overall approach to its management systems. These awards are externally validated by the British Assessment Bureau. LRN has achieved accreditation in the form of ISO 9001: Quality Management Systems, ISO 14001: Environment Management Systems and ISO 27001: Information Security Management Systems.

CUSTOMER SERVICE EXCELLENCE

LRN has achieved the prestigious award of Customer Service Excellence. This is in recognition of its customer service practices, approach to managing and dealing with UK and Overseas customer needs, including the diverse needs of its centres.

LRN was the first UK Awarding Organisation to achieve Customer Service Excellence.
Following reaccreditation in 2019, LRN received an award for Customer Service Excellence: Compliance Plus, demonstrating that LRN went above and beyond the delivery of its customer service principles.

INTRODUCTION

This specification provides an overview to the LRN International AS & A Level Artificial Intelligence[1]. This document is suitable for various users, including candidates, centres, administrators, employers, parents/guardians, teachers (and other educational based staff) and examiners. The specification outlines the key features and administrative procedures required for this international qualification.

OBJECTIVE

The LRN International AS & A Level Artificial Intelligence is designed to provide candidates with a theoretical grounding in the core principles of AI, while also developing the practical skills necessary to apply and evaluate intelligent systems in real-world contexts. The full range of subject content is shown below and includes foundational concepts of Artificial Intelligence, application of AI tools, and ethical implications of AI technologies.

MODE OF DELIVERY

This qualification has been constructed to be delivered within centres. Centres will need to demonstrate to LRN, through the centre recognition processes, that they have the resources, facilities and competence to deliver. However, centres must be able to demonstrate, in line with LRN's criteria, that they have the means, capability, capacity and resources (including suitably qualified centre staff) to deliver by the method chosen by the centre.

PROGRESSION

The LRN International AS & A Level Artificial Intelligence has been designed to reflect the wide variation in candidates' origins, levels of education and career aims. Progression opportunities may, therefore, take a variety of paths. Depending on the level of qualification achieved, it may be appropriate for the candidate to progress to:

1. Similar level 3 qualification in Artificial Intelligence;
2. LRN Level 3 Diploma in Pre U Foundation Studies;
3. Qualification (and/or membership) supported by the British Computer Society;
4. A higher level of any qualification – e.g., Diploma/ HNC/HND or Degree;
5. National or Vocationally Related Qualifications

[1] LRN International AS/A Level are globally recognised qualifications designed specifically for international candidates and are available outside the United Kingdom. Candidates based in England refer to the Ofqual register.

QUALIFICATION OVERVIEW

AS/A-LEVEL PAPER 1:

Number	Subject Content	AO	Exam
1	Foundations of Artificial Intelligence	1 and 3	**AS-Level** **Paper 1:** Multiple choice questions (MCQs), Short-answer questions and Structured/longer response questions. **Duration:** 1 hour 30 minutes Weighting: 50% **A-Level** **Paper 1:** Multiple choice questions (MCQs), Short-answer questions and Structured/longer response questions. **Duration:** 1 hour 30 minutes Weighting: 25%
2	Understanding Data and Decision-Making	1 and 3	
3	Language and Communication – Natural Language Processing in Education	1 and 3	
4	Vision and Pattern Recognition – AI in Retail and Marketing	1 and 3	
5	Ethical Foundations and Societal Impact	1 and 3	

AS/A-LEVEL PAPER 2:

Number	Subject Content	AO	Exam
1	Structured Content Generation for the Workplace	2 and 3	**AS Level** **Paper 2: Practical Application** Written Scenario-Based Practical Paper: Case studies, Structured application tasks, Prompt engineering challenges and Visual analysis or content generation tasks **Duration:** 1 hour 30 minutes Weighting: 50% **A Level** **Paper 2: Practical Application** Written Scenario-Based Practical Paper: Case studies, Structured application tasks, Prompt engineering challenges and Visual analysis or content generation tasks **Duration:** 1 hour 30 minutes Weighting: 25%
2	Analysing Data and Public Sentiment	2 and 3	
3	Visualisation and Multimodal Outputs in Creative Industries	2 and 3	
4	Practical elements from topics in Paper 1 (e.g. NLP prompt tasks, visual generation)	2 and 3	

A-LEVEL PAPER 3:

Number	Subject Content	AO	Exam
1	Classical and Emerging Paradigms in Artificial Intelligence	1 and 3	**A-Level** **Paper 3:** Essay-style questions, Structured analytical tasks, Comparative analysis of models, algorithms, and frameworks. **Duration:** 2 hour 30 minutes Weighting: 50%
2	Neural Models, Architectures and Prompt Strategies	1 and 3	
3	Decision Modelling, Data Analysis and Evaluation	1 and 3	
4	Regulation, Ethics and AI Safety	1 and 3	
5	Reinforcement Learning and Decision Optimisation	1 and 3	
6	Interdisciplinary AI Applications	1 and 3	
7	Software Development and AI Integration	1 and 3	
8	Future Directions, Skills and Careers in Artificial Intelligence	1 and 3	

BREAKDOWN OF ASSESSMENT OBJECTIVES

AO1: Demonstrate knowledge and understanding of artificial intelligence concepts, terminology, methodologies and ethical/legal frameworks.

AO2: Apply skills in problem-solving, prompt engineering, workflow development and data handling to create AI-driven responses or tools.

AO3: Analyse, evaluate and reflect on the effectiveness, appropriateness and implications of AI systems and methods.

ASSESSMENT

The assessment for this qualification consists of (i) written exam papers, and (ii) practical demonstration of skills, set and marked by the LRN.

Assessment objectives (AOs)	Weighting		
	Paper 1	Paper 2	Paper 3
AO1	60%	0%	40%
AO2	0%	80%	30%
AO3	40%	20%	30%

GUIDED LEARNING HOURS (GLH)

The LRN International AS Level guided learning hours (GLH) are 180 and 360 guided learning hours for LRN International A Level. Please note the hours stated are indicative.

ENTRIES CODES

One entry per qualification is sufficient and will cover all the question papers including certification.

PRIVATE CANDIDATES

Centres are advised that private candidates are only to be enrolled with prior agreement and confirmation from LRN.

GRADING

The LRN International A Level will be graded on a six-point scale: A*, A, B, C, D and E and LRN International AS Level will be graded on a five-point scale: A, B, C, D and E Candidates who fail to reach the minimum standard for grade E will be recorded as U (unclassified) and will not receive a qualification certificate.

RESULTS

Exam series are in:

- January (results released in March)
- June (results released in August)
- November (results released in January)

RE-TAKES

Whereas candidates can re-take each paper as often as they wish, within the shelf-life of the specification.

CUSTOMER SERVICE STATEMENT

Learning Resource Network (LRN) is committed to ensuring all customers are dealt with promptly and in a professional and helpful manner. In order to guarantee this, we commit to ensuring the following in our day to day interactions with candidates, assessment centres and our stakeholder network:

- All customers will be treated equally and with respect;
- All customer information will only be used in a way which has been agreed in advance, unless we are informed of something that places them or others at risk of harm;
- All customers will be treated by staff in a professional manner.

LRN has arrangements in place to provide a telephone and e-mail helpdesk which will be staffed from 09:00 to 17:00 from Monday to Friday. Furthermore, it will respond to each e-mail, letter or telephone message it receives regarding feedback on its qualifications, centre approvals process or other matters relating to its products and/or services. The timetable for responding is as follows:

- E-mail: 10 working days
- Letter: 10 working days
- Telephone message: 5 working days

DIVERSITY AND EQUALITY

Learning Resource Network (LRN) is committed to ensuring fair and equal access to its qualifications, examinations and support materials. Our Diversity and Equality policy seeks to eliminate unjustifiable discrimination, harassment and/or victimisation and to advance equality of opportunity, thereby ensuring all candidates are treated fairly, in accordance with the protected characteristics of the Equality Act 2010. Specifically, we comply fully with the requirements laid out in the Equality Act 2010. In addition, and within the constraints of this policy, LRN will have due regard for the General data Protection Regulations (GDPR) in the retention of information which is unnecessary.

1	**Foundations of Artificial Intelligence**		
Aim The aim of this unit is to enable candidates to build a conceptual understanding of artificial intelligence as a cross-disciplinary field. Candidates will explore AI's historical evolution, key paradigms, foundational system components, and typical applications across domains such as language, vision, and interaction.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the definition and historical context of artificial intelligence.	1.1	Define artificial intelligence within the context of various academic disciplines.
		1.2	Describe major historical milestones in the development of AI, including key breakthroughs in symbolic systems and machine learning.
		1.3	Compare the characteristics and assumptions of rule-based systems versus data-driven learning models.
2	Understand the components and operations of a typical AI system.	2.1	Describe the stages of the AI pipeline, including data input, transformation, decision logic, and output.
		2.2	Explain how knowledge representation and inference facilitate intelligent behaviour in AI systems.
3	Understand key categories and applications of AI technologies.	3.1	Distinguish between AI technologies focused on text, vision, speech, and interactive systems.
		3.2	Describe representative real-world applications corresponding to each AI technology category.

2	**Understanding Data and Decision-Making**		
Aim The aim of this unit is to introduce candidates to the foundational role of data in artificial intelligence. Candidates will explore how machine learning models utilise structured data to support decision-making, examine simple algorithmic approaches, and evaluate the strengths and risks of data-centric methods.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the role of data in AI model development.	1.1	Describe how structured data informs AI decision-making.
		1.2	Classify the types and structures of data used in model training.
2	Understand and apply basic machine learning algorithms.	2.1	Explain how a decision tree model processes data and generates outputs.
		2.2	Demonstrate how machine learning models learn patterns and make predictions.
		2.3	Apply prompt engineering techniques to influence model behaviour and prediction clarity.
3	Understand the limitations of data-driven systems.	3.1	Define key risks in data-centric modelling, including overfitting and poor generalisation.
		3.2	Analyse how biased or incomplete input data can lead to misleading or unethical outcomes.

3	**Language and Communication – Natural Language Processing in Education**		
Aim The aim of this unit is to enable candidates to understand and apply Natural Language Processing (NLP) techniques in educational contexts. Candidates will explore common NLP tasks, evaluate how language-based AI tools support teaching and learning, and critically assess the strengths and limitations of such technologies in handling human communication.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the role and functions of NLP within artificial intelligence.	1.1	Describe the key features and goals of Natural Language Processing.
		1.2	Explain common NLP tasks such as summarisation, translation, and intent recognition.
		1.3	Analyse how NLP enables interaction between humans and AI in educational applications.
2	Understand and evaluate the application of NLP in educational contexts.	2.1	Explain how NLP is used in tutoring systems, automated feedback, and grading support.
		2.2	Assess the benefits and limitations of NLP-based tools in educational settings.
		2.3	Evaluate real-world examples of NLP use in classrooms or e-learning platforms.
3	Be able to craft and refine prompts for NLP systems in education.	3.1	Construct prompts for AI tools to generate or interpret educational content.
		3.2	Refine prompts to improve relevance, tone, and accuracy of AI-generated responses.
		3.3	Assess the effectiveness of AI-generated outputs for different educational tasks.

4	Understand the challenges of human language for NLP systems.	4.1	Identify issues related to ambiguity, tone, and context in natural language.
		4.2	Analyse how these challenges affect the accuracy and appropriateness of NLP outputs.
		4.3	Suggest strategies to mitigate or address limitations in language-based AI tools.

4	**Vision and Pattern Recognition – AI in Retail and Marketing**		
Aim The aim of this unit is to introduce candidates to how artificial intelligence interprets visual data through techniques such as image recognition, classification, and generation. Candidates will explore how these capabilities are applied in retail and marketing, including visual product analysis and content creation, with an emphasis on aesthetic coherence and branding consistency.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand how AI systems interpret and generate visual information.	1.1	Explain the principles of image recognition, classification, and generation in AI systems.
		1.2	Describe how AI extracts features and predicts labels from visual datasets.
		1.3	Compare different methods of image processing used in machine learning models.
2	Understand how visual AI is applied in retail and marketing environments.	2.1	Identify key retail use cases of AI, such as product identification and shelf analysis.
		2.2	Analyse how AI is used to deliver personalised visual content to customers.
		2.3	Describe how generative AI is used to create advertising images and promotional visuals.
3	Apply AI tools to develop visually consistent retail marketing content.	3.1	Apply a vision-based AI tool to generate or modify visuals that meet task requirements.
		3.2	Assess the visual style and branding tone of AI-generated imagery.
		3.3	Justify the selection of AI-generated visuals based on alignment with brand identity and campaign goals.

5	Structured Content Generation for the Workplace		
Aim The aim of this unit is to enable candidates to understand how artificial intelligence can assist in the structured generation of professional documents in workplace settings. Candidates will explore prompt strategies, typical document types, and practical techniques for generating, evaluating, and refining AI-assisted outputs such as reports, agendas, and presentations.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand how AI tools support structured document generation.	1.1	Describe common workplace outputs that can be generated with AI (e.g. business briefings, slide decks, financial summaries).
		1.2	Explain the role of prompt design in shaping structured outputs.
		1.3	Describe how AI tools assist with layout features such as headings, tables, and bullet points.
2	Be able to generate professional workplace documents using AI.	2.1	Design effective prompts to generate specific structured outputs.
		2.2	Produce a business document using an AI system, incorporating layout and content conventions.
		2.3	Refine AI-generated outputs to improve coherence, tone, or formatting.
3	Understand techniques for evaluating and improving AI-generated documents.	3.1	Apply criteria to assess the clarity, logical flow, and tone of an AI-generated document.
		3.2	Identify and correct factual inconsistencies or omissions in AI-generated drafts.
		3.3	Evaluate formatting issues and suggest improvements to align with workplace standards.

6	**Analysing Data and Public Sentiment**		
Aim The aim of this unit is to enable candidates to use AI tools to analyse large datasets and detect public sentiment, particularly in the context of social media, branding, and customer feedback. Candidates will explore techniques for summarising, interpreting, and critically evaluating sentiment and tone in data, while considering model limitations such as bias and ambiguity.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand how AI models are used to summarise and classify large-scale data.	1.1	Describe methods AI models use to summarise datasets and extract key information.
		1.2	Identify examples of AI-supported sentiment or tone classification tasks.
		1.3	Explain how aggregated outputs can support public engagement analysis.
2	Be able to apply AI tools for sentiment and tone analysis.	2.1	Design effective prompts to perform to perform sentiment detection on sample social or survey data.
		2.2	Apply AI tools to generate accurate and meaningful summaries or visualisations of public sentiment, and interpret the outputs in context.
		2.3	Analyse tone and categorisation across different data sources.
3	Understand the limitations and risks in interpreting AI-processed public data.	3.1	Identify examples of bias, exaggeration, or misleading sentiment classification.
		3.2	Evaluate ambiguous or conflicting signals in AI-generated outputs.
		3.3	Propose strategies to improve the reliability and transparency of AI-driven analysis.

7	**Visualisation and Multimodal Outputs in Creative Industries**		
Aim The aim of this unit is to enable candidates to explore and apply AI-based tools for generating visual and multimodal content in creative industries. Candidates will evaluate how AI transforms text into visual formats such as infographics, images, and posters, understand the design and communication aspects of these outputs, and consider ethical and cultural implications of using AI in content creation.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand how AI tools generate visual outputs from textual input.	1.1	Describe how AI systems convert descriptive prompts into visual content (e.g. illustrations, poster layouts, infographics).
		1.2	Examine the role of generative models (e.g. diffusion models, GANs) in the creation of images or design elements.
		1.3	Compare different AI tools used in the automatic generation of graphs, visuals, or infographics based on textual data.
		1.4	Analyse the strengths and limitations of AI-generated visual content in conveying information.
2	Understand the concept and applications of multimodal AI in creative contexts.	2.1	Define multimodal AI and identify examples that combine text, image, audio, or video.
		2.2	Analyse how multimodal AI systems are applied in communication, product design, or digital marketing.
		2.3	Evaluate how multimodal integration enhances audience engagement and user experience.
3	Be able to apply AI tools to create visual outputs for specified creative scenarios.	3.1	Create a visual media output using AI tools that aligns with a creative brief and aesthetic requirements.
		3.2	Adapt AI prompts to influence the visual style, layout, and messaging of the output.
		3.3	Justify choices made in prompt design and tool selection with reference to communication goals.

		3.4	Critically review the generated visual output in terms of accuracy, appeal, and appropriateness for the target audience.
4	Understand the ethical and cultural considerations in AI-generated media.	4.1	Discuss ethical concerns such as originality, copyright, attribution, and misinformation in AI-generated media.
		4.2	Investigate how AI-generated visual content may reflect or misrepresent cultural values or artistic norms.
		4.3	Evaluate the potential influence of AI-generated media on audience perception, including bias and emotional appeal.
		4.4	Propose strategies to ensure responsible and culturally aware use of AI in creative media production.

8	**Ethical Foundations and Societal Impact**		
Aim The aim of this unit is to enable candidates to critically examine the ethical principles, social risks, and regulatory implications surrounding AI systems. Candidates will explore themes such as fairness, bias, transparency, and data privacy, as well as analyse the broader societal impact of AI technologies in contexts such as media, surveillance, employment, and global governance.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand key ethical principles relevant to AI development and deployment.	1.1	Define core ethical principles such as fairness, bias, transparency, and accountability in the context of AI.
		1.2	Explain how these principles apply to algorithmic decision-making systems.
		1.3	Analyse tensions between competing values (e.g. accuracy vs. fairness; transparency vs. proprietary algorithms).
		1.4	Explain the importance of ethical design processes throughout the AI lifecycle.
2	Understand data protection principles and personal privacy rights in relation to AI systems.	2.1	Describe the concept of informed consent in AI-powered data collection.
		2.2	Summarise key provisions of data protection frameworks, such as the GDPR.
		2.3	Evaluate how AI applications may threaten or reinforce personal privacy.
		2.4	Assess the responsibilities of organisations in managing data ethically and legally.
3	Be able to evaluate the societal impacts and risks of AI technologies.	3.1	Examine how AI systems may contribute to shifts in employment and labour practices.
		3.2	Investigate the role of AI in spreading misinformation and undermining media credibility.

		3.3	Evaluate implications of social risk involving AI, such as deepfakes, surveillance systems, and algorithmic exclusion.
		3.4	Evaluate strategies for mitigating risks and unintended consequences in AI adoption.
4	Understand global perspectives on AI governance and public discourse.	4.1	Compare different regional or national approaches to AI regulation and oversight.
		4.2	Discuss the role of governmental and non-governmental bodies in shaping AI policy.
		4.3	Analyse global challenges such as cross-border data governance and ethical standardisation.
		4.4	Reflect on the role of public consultation, civic education, and transparency in building trust in AI systems.

9	**Classical and Emerging Paradigms in Artificial Intelligence**		
Aim The aim of this unit is to equip candidates with an understanding of the historical foundations, core principles, and algorithmic structures of classical artificial intelligence. Candidates will explore the distinction between symbolic (rule-based) and sub-symbolic (learning-based) approaches, study foundational search algorithms, and analyse knowledge representation schemes and expert systems. The unit also introduces candidates to the evolution from classical logic-driven systems to modern data-driven paradigms.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the distinction between symbolic and sub-symbolic approaches in artificial intelligence.	1.1	Describe the characteristics of symbolic (rule-based) systems in AI.
		1.2	Describe the characteristics of sub-symbolic (statistical or learning-based) systems.
		1.3	Compare symbolic and sub-symbolic approaches in terms of interpretability, structure, and application domains.
		1.4	Identify real-world scenarios where symbolic methods may be more suitable or interpretable than sub-symbolic methods.
2	Understand and apply classical search algorithms used in problem-solving.	2.1	Describe uninformed search strategies such as depth-first search (DFS) and breadth-first search (BFS).
		2.2	Describe informed search techniques including A* algorithm and heuristics.
		2.3	Implement basic search strategies in structured problem settings (e.g., path planning).
		2.4	Compare the trade-offs between search strategies with respect to time complexity, completeness, and optimality.
3	Understand the principles of game-tree search and decision making.	3.1	Explain the concept of adversarial search in a deterministic, zero-sum environment.

		3.2	Describe the working of the minimax algorithm and its use in decision making.
		3.3	Explain the role of heuristic evaluation functions in approximating game outcomes.
		3.4	Identify limitations of basic game-tree algorithms and justify when more advanced variants may be needed (e.g., alpha-beta pruning).
4	Understand foundational methods of knowledge representation and rule-based reasoning.	4.1	Define knowledge representation and explain its importance in AI systems.
		4.2	Describe key methods such as semantic networks and production rules.
		4.3	Explain the structure and functionality of expert systems, including knowledge bases and inference engines.
		4.4	Analyse situations in which rule-based inference remains effective in modern AI applications (e.g., safety systems, compliance tools).
5	Understand the evolution of AI paradigms from classical to modern approaches.	5.1	Describe the historical development of AI from logic-based to learning-based systems.
		5.2	Assess the limitations of classical rule-based systems in dynamic or complex environments.
		5.3	Explain how advances in data availability and computing power enabled the rise of machine learning.
		5.4	Identify cases where hybrid approaches (combining symbolic and sub-symbolic elements) are used in modern AI systems.

10	Neural Models, Architectures and Prompt Strategies		
Aim The aim of this unit is to enable candidates to understand the structure and function of neural networks, evaluate major deep learning architectures, and apply prompting strategies to enhance AI outputs in complex tasks. Candidates will explore technical mechanisms such as backpropagation, embeddings, attention, and generative models, and develop competence in designing and refining prompts across a range of modality-specific tasks.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the structure and learning mechanisms of neural networks.	1.1	Describe the role of neurons, layers, weights, bias, and activation functions in a feedforward neural network.
		1.2	Explain the concept and process of forward propagation and backpropagation.
		1.3	Analyse how learning occurs through weight updates using gradient descent.
		1.4	Identify factors that influence a network's learning performance (e.g. learning rate, overfitting).
2	Understand the principles and components of common deep learning architectures.	2.1	Describe the key structural features and use cases of convolutional neural networks (CNNs).
		2.2	Describe the architecture and applications of recurrent neural networks (RNNs) and their variants.
		2.3	Explain the principles of transformer models, including self-attention and positional encoding.
		2.4	Compare the suitability of CNNs, RNNs, and transformers for different data types and tasks (e.g. image, time-series, text).
3	Understand key mechanisms for data representation within neural systems.	3.1	Define the concept of embeddings and explain their role in mapping high-dimensional data to dense vector spaces.

		3.2	Explain how attention mechanisms improve context sensitivity in sequence modelling.
		3.3	Describe the role of positional encoding in sequence-aware neural systems.
		3.4	Analyse how these techniques contribute to better performance in NLP and image understanding tasks.
4	Understand the design and training of generative neural models.	4.1	Describe the basic idea of generative models and how they produce new data from learned distributions.
		4.2	Explain the concept of adversarial training in GANs, including the generator–discriminator relationship.
		4.3	Identify applications of generative techniques in text, image, and multimodal generation.
		4.4	Evaluate strengths and limitations of generative models in terms of originality, coherence, and control.
5	Be able to design and refine prompts for data-driven AI systems.	5.1	Apply prompt engineering strategies to achieve specific goals in NLP, image generation, or multimodal tasks.
		5.2	Use techniques such as chain-of-thought reasoning to guide multi-step problem-solving within AI models.
		5.3	Construct prompts with specialised roles or constraints (e.g. instructing tone, persona, creativity bounds).
		5.4	Evaluate the quality and effectiveness of prompts by analysing output accuracy, relevance, and interpretability.
		5.5	Refine prompts iteratively based on model behaviour and output style.

11	Decision Modelling, Data Analysis and Evaluation		
Aim The aim of this unit is to enable candidates to apply analytical frameworks to AI-based decision-making. Candidates will learn how to use regression and classification models, evaluate performance using appropriate metrics, and interpret outcomes using explainability techniques. The unit also focuses on principles of reliability, bias detection, model generalisability, and tackling data and prediction uncertainty in practical contexts.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand classification and regression methods in decision modelling.	1.1	Define the purpose and basic function of classification and regression models.
		1.2	Describe the differences between categorical and continuous output modelling.
		1.3	Select appropriate model types based on data structure and task objective.
		1.4	Compare decision outcomes from different models applied to similar datasets.
2	Be able to evaluate model performance using appropriate metrics.	2.1	Define and compute classification metrics such as accuracy, precision, recall, and F1-score.
		2.2	Interpret confusion matrices and their role in performance analysis.
		2.3	Describe ROC curves and explain the significance of AUC in evaluating classifiers.
		2.4	Apply evaluation metrics to identify strengths and limitations in model performance.
3	Understand factors affecting model reliability and generalisability.	3.1	Explain the concepts of model overfitting and underfitting.
		3.2	Analyse how data quality and quantity influence model robustness.

		3.3	Define model generalisability and discuss the importance of cross-validation.
		3.4	Justify model selection and trustworthiness based on task conditions and data distribution.
4	Understand model explainability and interpretability techniques.	4.1	Define explainability and interpretability in the context of AI models.
		4.2	Describe methods such as SHAP values, saliency maps, or feature importance ranking.
		4.3	Analyse how these techniques can help identify feature contributions and improve transparency.
		4.4	Evaluate the effectiveness of explainability tools in supporting stakeholder trust and informed decision-making.
5	Be able to identify common limitations and sources of bias in AI systems.	5.1	Define and recognise model bias rooted in dataset imbalance or feature selection.
		5.2	Describe data drift and its impact on model performance over time.
		5.3	Assess how uncertainty may arise in AI predictions and how it can be quantified.
		5.4	Propose strategies to mitigate bias, manage drift, or communicate prediction uncertainty.

12	Regulation, Ethics and AI Safety		
Aim The aim of this unit is to enable candidates to understand legal, ethical, and safety considerations in the development and deployment of AI systems. Candidates will explore international frameworks such as the GDPR and EU AI Act, interpret ethical principles applied to real-world technologies, and evaluate safety strategies designed to protect public interest while supporting innovation. This unit prepares candidates to assess the governance of emerging AI applications and propose mechanisms for accountability and harm reduction.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand legal and ethical frameworks governing AI technologies.	1.1	Evaluate the influence of international regulatory frameworks such as the GDPR, EU AI Act, and UNESCO Ethical AI Guidelines.
		1.2	Explain how legal concepts such as lawfulness, fairness, transparency, and data minimisation apply to AI system design.
		1.3	Identify the obligations of AI developers and deployers under relevant legal frameworks.
		1.4	Compare how regulatory approaches vary across different global regions.
2	Understand the importance of explainability and accountability in AI systems.	2.1	Define the concept of explainability and differentiate between model-level and system-level explanations.
		2.2	Analyse why explainability is crucial in high-risk domains such as justice, healthcare, and finance.
		2.3	Evaluate the relationship between explainability, human oversight, and algorithmic accountability.
		2.4	Propose methods to improve transparency and accountability in the deployment of AI systems.

3	Be able to assess ethical and societal risks associated with emerging AI technologies.	3.1	Identify ethical and social challenges related to technologies such as deepfake generation, autonomous systems, and general-purpose models.
		3.2	Discuss the risks of eroding public trust or amplifying societal harm through misuse or insufficient regulation.
		3.3	Analyse the role of public discourse, civic institutions, and journalism in shaping responsible AI development.
		3.4	Evaluate real-world cases where failure to anticipate AI risks led to reputational damage or legal scrutiny.
4	Be able to propose and assess strategies for risk mitigation and AI safety.	4.1	Describe common safety tools such as red teaming, algorithmic auditing, differential privacy, and impact assessments.
		4.2	Assess the suitability of harm reduction techniques for various types of AI systems and deployment contexts.
		4.3	Propose multi-stakeholder mechanisms to strengthen safe and equitable AI adoption (e.g., ethics boards, pilot studies, community participation).
		4.4	Justify how governance measures can balance innovation with public safety and legal compliance.

13	**Reinforcement Learning and Decision Optimisation**		
Aim The aim of this unit is to provide candidates with a conceptual and practical understanding of reinforcement learning (RL) as a framework for adaptive decision-making. Candidates will explore the key components of RL systems—such as agents, environments, rewards, and policies—and examine algorithms such as Q-learning and policy gradients. The unit also covers techniques for temporal reasoning, simulating decisions under uncertainty, and comparing AI-driven strategies with human policy-making in real-world contexts.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the foundational components of reinforcement learning.	1.1	Define the core framework of reinforcement learning, including agent, environment, state, action, reward, and policy.
		1.2	Describe the interaction cycle between agent and environment over multiple time steps.
		1.3	Explain the purpose and structure of value functions, including Q-values.
		1.4	Compare model-free and model-based reinforcement learning approaches.
2	Understand and analyse reinforcement learning algorithms.	2.1	Explain the Q-learning algorithm and how the Q-table is updated through learning episodes.
		2.2	Describe the concept of policy gradients and how they differ from value-based methods.
		2.3	Assess the impact of exploration strategies (e.g., ϵ-greedy, softmax) on learning performance.
		2.4	Analyse how different reward structures influence policy development and long-term outcomes.
3	Be able to model tasks involving sequential decision-making under uncertainty.	3.1	Construct representations of tasks with sequential choices, goals, and feedback (e.g., gridworld, dynamic resource allocation).

		3.2	Simulate decision-making using a defined reinforcement learning environment such as prompt-based tools or RL-enabled environments.
		3.3	Apply temporal abstraction techniques (e.g., multi-step returns, discounting) in constructed models.
		3.4	Evaluate how uncertainty and delayed rewards affect exploration, convergence, and task performance.
4	Understand real-world applications and limitations of reinforcement learning.	4.1	Identify domains where reinforcement learning has been successfully applied (e.g., robotics, healthcare, supply chains).
		4.2	Compare AI-optimised decision policies with human-designed rules in terms of efficiency, adaptability, and transparency.
		4.3	Critically assess limitations of RL systems, including sparse rewards, unintended behaviour, and scalability concerns.
		4.4	Propose ways to mitigate common RL challenges in real-world deployment (e.g., reward shaping, offline RL, simulation environments).

14	**Interdisciplinary AI Applications**		
Aim The aim of this unit is to enable candidates to explore how AI techniques are used across a range of disciplines and to develop a critical understanding of the similarities, differences, and challenges associated with cross-sector applications. Candidates will compare AI workflows across healthcare, law, finance, sustainability, and engineering, and evaluate domain-specific constraints. The unit also focuses on developing transferable methodologies to solve real-world problems using AI systems in varied contexts.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the core components of AI development pipelines across sectors.	1.1	Identify recurring stages in the AI pipeline such as data acquisition, preprocessing, model training, evaluation, and deployment.
		1.2	Explain how sector-specific data types (e.g., medical records, financial time series, satellite imagery) affect AI system design.
		1.3	Analyse how the standard AI pipeline is adapted to suit different disciplines.
		1.4	Distinguish between generic and domain-specific constraints in AI workflows.
2	Be able to compare and evaluate AI applications in multiple disciplinary contexts.	2.1	Compare the role of AI in at least three sectors (e.g., healthcare, law, sustainability, finance).
		2.2	Analyse how accuracy, interpretability, safety, or fairness are prioritised differently according to domain-specific needs.
		2.3	Identify technical, ethical, and regulatory limitations affecting adoption in each sector.
		2.4	Evaluate how stakeholder expectations shape AI use cases across different fields.
3	Be able to design transferable AI strategies suited to diverse problem domains.	3.1	Develop a generalised framework for identifying problems that can be addressed using AI.

		3.2	Propose adaptation strategies to tailor existing AI solutions (e.g., classification, forecasting, optimisation) to new domains.
		3.3	Design a cross-disciplinary solution using AI methods while considering relevant domain constraints.
		3.4	Justify the applicability of a chosen AI methodology to a specific use case and explain limitations.

15	Software Development and AI Integration		
Aim The aim of this unit is to enable candidates to use AI-based tools to support software development processes, including code creation, testing, and validation. Candidates will explore AI-assisted platforms, low/no-code environments, and the role of AI in agile development settings. The unit also encourages critical reflection on practical, team-based, and ethical implications of integrating AI into software engineering workflows.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand the role of AI tools in software development processes.	1.1	Describe how AI models can generate code, detect errors, and assist with test case generation or requirement checking.
		1.2	Analyse typical use cases for AI in development workflows (e.g., bug fixing, auto-completion, code summarisation).
		1.3	Explain how static analysis tools use AI to identify potential vulnerabilities or inefficiencies.
		1.4	Evaluate the benefits and drawbacks of relying on generative tools in structured programming tasks.
2	Understand the use of AI-assisted platforms and collaborative tools.	2.1	Describe how low-code and no-code platforms incorporate AI to support software development.
		2.2	Compare traditional IDEs with AI-assisted development environments in terms of user interaction and productivity.
		2.3	Explain the function of AI co-pilot systems in pair programming or team settings.
		2.4	Analyse how AI-based features support agile iteration, rapid prototyping, or continuous integration.
3	Be able to apply AI tools for structured development and validation tasks.	3.1	Demonstrate effective use of an AI tool to generate functional code based on a defined specification.

		3.2	Apply prompt refinement techniques to improve relevance or correctness of generated code.
		3.3	Employ code review features or static analysis outputs to support quality assurance.
		3.4	Validate generated code by comparing it to functional requirements.
4	Understand ethical and collaborative implications of AI automation in software teams.	4.1	Discuss how AI affects responsibility, authorship, and intellectual property in collaborative software projects.
		4.2	Evaluate risks related to quality inconsistency and explainability of AI-generated code.
		4.3	Analyse how AI integration may shift roles within development teams (e.g., junior dev vs. “prompt engineer”).
		4.4	Justify strategies to promote transparency, traceability, and maintainability in AI-augmented development workflows.

16	Future Directions, Skills and Careers in Artificial Intelligence		
Aim The aim of this unit is to introduce candidates to emerging trends, career opportunities, and ethical responsibilities in the evolving field of artificial intelligence. Candidates will explore recent developments such as foundation models and agent-based reasoning architectures, assess the changing landscape of AI-related roles, and evaluate the personal and societal expectations of professionals working in AI. The unit also supports candidates in navigating academic qualifications and lifelong learning pathways relevant to the AI profession.			
Learning Outcomes- The learner will:		**Assessment Criteria - The learner can:**	
1	Understand emerging technologies and trends shaping the future of AI.	1.1	Describe the significance of recent advances such as foundation models, scalable AI infrastructure, and agent-based reasoning.
		1.2	Analyse how developments in compute, modelling techniques and open access research accelerate capability growth.
		1.3	Assess the implications of frontier AI capabilities for society, governance, and human-AI interaction.
		1.4	Identify emerging risks and opportunities created by increasingly capable and general-purpose AI technologies.
2	Understand new and evolving roles in the AI workforce across disciplines.	2.1	Summarise and contrast various career roles in AI, including but not limited to ethics auditors, responsible AI researchers, AI product managers, and prompt engineers.
		2.2	Compare the responsibilities, required skills and impacts of AI-related roles across different sectors (e.g. healthcare, tech, government, environment).
		2.3	Assess how automation may reconfigure traditional roles or create hybrid skill profiles.
		2.4	Analyse how team-based and cross-functional collaboration is changing in AI-enabled organisations.

3	Be able to explore educational pathways and skills required for careers in AI.	3.1	Identify academic disciplines and qualifications relevant to different AI-related career trajectories.
		3.2	Map transferable and specialist skills needed across AI roles, including programming, statistics, systems thinking, and ethical reasoning.
		3.3	Evaluate the importance of lifelong learning, upskilling, and interdisciplinary perspective in an evolving AI landscape.
		3.4	Propose a personal development plan or study route aligned with a chosen AI career interest.
4	Understand the ethical and social responsibilities of AI professionals.	4.1	Explain the importance of value alignment, fairness, and inclusivity in AI system design and deployment.
		4.2	Evaluate how professional conduct affects trust, accountability and long-term societal benefit.
		4.3	Discuss how AI workers can actively contribute to responsible innovation and governance.
		4.4	Justify the need for stewardship, transparency and critical reflection in high-impact AI development contexts.

APPENDIX

Use of calculator

Calculators are not allowed on any paper.

AI use in the Practical Assessment

Candidates may use AI tools in the problem-solving phase of the practical assessment, where the use of such tools forms part of the development of an AI-assisted solution. This includes activities such as:

- Designing and refining prompts to generate appropriate outputs from AI models.
- Analysing, curating, or preparing data to be used by an AI system.
- Testing, adjusting, or implementing AI-supported workflows to produce outcomes relevant to the chosen problem.
- All AI usage during this phase must be clearly documented in the candidate's project report.

AI tools must not be used to write, draft, rephrase or edit:

- The project report.
- The presentation.

These assessment are designed to assess the candidate’s own understanding, communication and evaluation. Therefore, candidates must complete both the report and presentation without AI assistance. All analysis, justification, reflection and commentary included in these outputs must be entirely the candidate’s own work.

Maintaining Academic Integrity

Candidates are responsible for ensuring that any use of AI complies with the boundaries set out in this specification. Any undeclared or inappropriate use of AI, including use in writing the report or presentation, may be considered academic malpractice and reported accordingly.

Centres must support candidates in understanding these expectations and monitor submissions to confirm compliance