NATIONAL SKILLS QUALIFICATION

LEVEL 4

TITLE:
ARTIFICIAL INTELLIGENCE

YEAR:

2024

NSQ LEVEL 4 - Artificial Intelligence

GENERAL INFORMATION

QUALIFICATION PURPOSE:

The Qualification aims to equip learners with appropriate AI skills, focusing on designing and implementing elementary AI solutions

QUALIFICATION OBJECTIVES

To achieve this qualification, the operator should be able to:

- Develop a Comprehensive Understanding of AI Fundamentals.
- Explore Ethical Considerations in AI
- Integrate AI with Big Data
- Develop a Comprehensive Understanding of Machine Learning
- Gain Proficiency in Deep Learning Techniques
- Explore Natural Language Processing
- Understand Computer/Machine Vision Solutions
- Understand Generative AI Models

Mandatory Units

S/No /Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 001	ICT/GSS/001/L3	Occupational Health and Safety	1	10	*Mandatory*
Unit 002	ICT/GSS/002/L3	Teamwork	1	10	*Mandatory*
Unit 003	ICT/GSS/003/L3	Communication	1	10	*Mandatory*
Unit 004	ICT/AI/4/004/L4	Fundamentals of Artificial Intelligence	2	20	*Mandatory*
Unit 005	ICT/AI/4/005/L4	Artificial Intelligence Ethics	2	20	*Mandatory*
Unit 006	ICT/AI/4/006/L4	Big Data Management	2	20	*Mandatory*
Unit 007	ICT/AI/4/007/L4	Machine Learning	2	20	*Mandatory*
Unit 008	ICT/AI/4/008/L4	Introduction to Deep Learning	2	20	*Mandatory*
Unit 009	ICT/AI/4/009/L4	Natural Language Processing	2	20	*Mandatory*
Unit 010	ICT/AI/4/010/L4	Introduction to Computer/Machine Vision	2	20	*Mandatory*
Unit 011	ICT/AI/4/011/L4	Fundamentals of Generative AI	2	20	*Mandatory*
TOTAL			**19**	**190**	

NOTE:

Mandatory Units

Learners must complete all mandatory units to gain advanced skills in Artificial Intelligence. These units are designed to provide a comprehensive foundation in AI principles and practices, encompassing both theoretical knowledge and practical application. The credit hours for mandatory units are non-negotiable and must be fully completed to obtain the NSQ Level 4 Artificial Intelligence qualification.

Total Credit Hours from Mandatory Units: 190

Unit 001: OCUPATIONAL HEALTH AND SAFETY

Unit Reference Number: ICT/GSS/001/L3

NSQ Level: 3

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose: *To equip learners with the knowledge and skills to implement and maintain safe working practices in the IT environment, ensuring personal and team safety while adhering to industry regulations and standards.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 001: Occupational Health and Safety

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand Workplace Health and Safety Regulations	1.1	Explain key OHS legislation and regulations relevant to the IT sector.									
	1.2	Identify the roles and responsibilities of individuals and organizations in maintaining a safe work environment									
	1.3	Describe the process for reporting health and safety risks and incidents.									
LO 2: Identify Workplace Hazards and Implement Control Measures	2.1	Identify common hazards in IT work environments, including electrical, ergonomic, and data-related risks									
	2.2	Assess the severity and likelihood of potential hazards in specific IT tasks.									
	2.3	Implement appropriate control measures, such as safe cabling practices, ergonomic workstation setup, and electrical safety protocols.									
LO 3: Apply Emergency Procedures and First Aid in the Workplace	3.1	Demonstrate the correct procedure for responding to workplace emergencies, such as electrical fires or equipment malfunctions.									
	3.2	Perform basic first aid techniques, including treating minor injuries and using first aid equipment									
	3.3	Communicate and coordinate effectively with emergency services and other relevant personnel during a workplace incident.									

Learner's Signature	Date
Assessor's Signature	Date
IQA's Signature	Date
EQA's Signature	Date

Unit 002: Teamwork

Unit Reference Number: ICT/GSS/002/L3

NSQ Level: 3

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose: *To develop learners' abilities to work effectively within IT teams, fostering collaboration, problem-solving, and the achievement of shared goals.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 002: Teamwork

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the Roles and Responsibilities within a Team	1.1	Identify the different roles and functions within an IT team (e.g., network engineers, system administrators, software developers).									
	1.2	Describe the key responsibilities and contributions of each team member.									
	1.3	Recognize the importance of each role in achieving the team's objectives.									
LO 2: Foster Positive Working Relationships within a Team	2.1	Demonstrate techniques for effective interpersonal communication and conflict resolution in a team environment.									
	2.2	Show the ability to provide constructive feedback and actively listen to others' contributions									
	2.3	Promote inclusivity and collaboration among team members to ensure participation and engagement from all.									
LO 3: Contribute to Team Problem-Solving and Decision-Making	3.1	Participate in group discussions to identify and analyse IT-related problems.									
	3.2	Suggest innovative solutions and support team decision-making processes.									
	3.3	Evaluate the effectiveness of team decisions and propose improvements where necessary.									

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Unit 003: Communication

Unit Reference Number: ICT/GSS/003/L3

NSQ Level: 3

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose: *To enhance learners' communication skills, enabling them to convey technical information effectively and collaborate with both technical and non-technical stakeholders.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 003: Communication

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Communicate Technical Information Clearly and Accurately	1.1	Explain IT concepts, procedures, and solutions in a manner appropriate to the audience, whether technical or non-technical.									
	1.2	Use industry-standard terminology correctly when describing technical processes									
	1.3	Adapt communication methods to suit the context, such as written reports, emails, or verbal presentations.									
LO 2: Utilize Digital Communication Tools Effectively	2.1	Demonstrate proficiency in using digital tools for communication, such as email, messaging platforms, and collaboration software (e.g., Slack, Teams).									
	2.2	Adhere to best practices for professional digital communication, including email etiquette and secure file sharing.									
	2.3	Use collaborative tools to share and receive feedback on documents, code, or project updates.									
LO 3: Listen and Respond Appropriately in a Professional Context	3.1	Demonstrate active listening skills during team discussions or client meetings.									
	3.2	Respond to questions, concerns, and feedback clearly and effectively.									
	3.3	Clarify misunderstandings and summarize discussions to ensure mutual understanding.									

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Unit 004: Fundamentals of Artificial Intelligence

Unit Reference Number: ICT/AI/004/L4

NSQ Level: 3

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *Equip learners with the understanding of AI concepts, and applications across industries*.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 004: FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the concept and principles of AI	1.1	**Explain** the fundamental concept of AI									
	1.2	**Describe** the core principles of AI Technology									
	1.3	**Classify** AI according to functionality and capability.									
LO 2: Applications of AI across industries	2.1	**Recognize** the diverse applications of AI across industries.									
	2.2	**Identify** AI products or agents									
	2.3	**Analyze** the Impact of AI on Industry-Specific Operations									
LO 3: Demonstrate knowledge of AI Projects	3.1	**Create** a Object Storage resource									
	3.2	**Import** dataset model.									
	3.3	**Build** an AI model using Auto AI									
	3.4	**Execute** a prediction experiment for an AI model									
	3.5	**Save** a model as a Jupyter Notebook									

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Unit 005: Artificial Intelligence Ethics

Unit Reference Number: ICT/AI/005/L4

NSQ Level: 3

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *This unit aims to prepare learners to develop AI solutions that adhere to ethical standards.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 005: ARTIFICIAL INTELLIGENCE ETHICS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Ethics in Artificial Intelligence	1.1	**Identify** the five pillars of AI ethics									
	1.2	**Describe** fairness in AI									
	1.3	**Describe** protected attributes									
	1.4	**Identify** privileged groups and unprivileged groups									
	1.5	**Explain** AI bias									
LO 2: Explore Ethical Considerations in AI.	2.1	**Identify** Key Ethical Issues in AI Development									
	2.2	**Evaluate** the Impact of AI on Society and Human Rights									
	2.3	**Identify** Solutions to Address Ethical Challenges in AI									
	2.4	**Promote** awareness of the ethical implications of AI.									
LO 3 Analyze ethical implications of AI	3.1	**Assess** Potential Bias and Discrimination in AI Algorithms									
	3.2	**Examine** Privacy Concerns Related to AI Data Usage									
	3.3	**Evaluate** the Accountability and Transparency of AI Systems									

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Unit 006: Big Data Management

Unit Reference Number: ICT/AI/006/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *This unit ensures that learners are equipped to handle large-scale data challenges using AI.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 006: BIG DATA MANAGEMENT

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand Big data and its technologies	**1.1**	**Explain** Big data and popular big data technologies such as Hadoop, Spark, and NoSQL databases that are commonly used in AI applications.									
	1.2	**Describe** the Applications and Benefits of Big Data Across Sectors									
	1.3	**Apply** AI techniques in big data environments.									
LO 2: Understand Data Preprocessing	**2.1**	**Demonstrate** Common Data Preprocessing Techniques.									
	2.2	**Identify** Outliers and Anomalies in Datasets									
	2.3	**Explain** how to preprocess large datasets for AI.									
LO 3: Examine the real-world problems	**3.1**	**Identify** Key Challenges in Real-World Scenarios									
	3.2	**Perform** real-world tasks where AI and big data are integrated.									
	3.3	**Implement** a Recommendation systems with customers large dataset.									

Learner's Signature	Date:
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Unit 007: Machine Learning

Unit Reference Number: ICT/AI/007/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *This unit ensures that learners will be proficient in the building of learning models.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 007: Machine Learning

LEARNING OBJECTIVE (LO) **The learner will:**		**PERFORMANCE CRITERIA** **The learner can:**	**Evidence Type**					**Evidence Ref. Page No.**			
LO 1: Study the concepts of machine learning.	**1.1**	**Explain** the core concepts of Machine Learning.									
	1.2	**Identify** the types of machine learning									
	1.3	**Explain** the Workflow of a Machine Learning Model									
	1.4	**Describe** Common Machine Learning Algorithms and Their Applications									
LO 2: Perform basic Machine Learning task.	**2.1**	**Classify** different machine learning tasks into supervised, unsupervised, or reinforcement learning categories based on given scenarios.									
	2.2	**Select** appropriate Machine Learning Algorithm.									
	2.3	**Implement** the Preprocessing of Data to Fit the Chosen Model									
	2.4	**Implement** the Machine Learning Model									
LO 3: Perform a basic Machine Learning tasks (Project)	**3.1**	**Perform** prediction of housing prices with the right algorithm.									
	3.2	**Classify** Handwritten Digits (MNIST Dataset)									
	3.3	**Perform** sentiment Analysis on Text Data									

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Unit 008: Introduction to Deep Learning

Unit Reference Number: ICT/AI/008/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *Equip learners with a good understanding of Deep Learning frameworks and artificial neural networks.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 008: INTRODUCTION TO DEEP LEARNING

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand deep learning	1.1	**Explain** the concept of deep learning.									
	1.2	**Identify** deep learning models.									
	1.3	**Distinguish** between artificial intelligence, machine learning, and deep learning.									
LO 2: Use no-code AI platforms for deep learning.	**2.1**	**Identify** AI platforms for deep learning.									
	2.2	**Explain** the steps required to use 2.1 above.									
	2.3	**Create** any given specific/custom image classification models.									
LO 3: Execute a deep learning project.	**3.1**	**Implement** Image Classification with a Convolutional Neural Network (CNN)									
	3.2	**Use** the MNIST dataset to classify handwritten digits (0-9) using a simple fully connected neural network.									
	3.3	**Build** Recurrent Neural Network (RNN) to classify the sentiment (positive or negative) of movie reviews from the IMDb dataset.									

Learner's Signature	Date:
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Unit 009: Natural Language Processing

Unit Reference Number: ICT/AI/009/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *This unit aims to equip the learner with essential NLP tasks like sentiment analysis, machine translation, and text summarization.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 009: NATURAL LANGUAGE PROCESSING

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Study the concept and principle of Natural Language Processing (NLP)	**1.1**	**Explain** the concept of NLP									
	1.2	**Describe the** principles of NLP									
	1.3	**Identify** NLP Models									
LO 2: **Examine** Natural Language Processing Techniques	**2.1**	**Explain** the NLP terms/activities such as tokenization, stopword removal, stemming, etc.									
	2.2	**Demonstrate** Text Preprocessing Methods									
	2.3	**Analyze** the Performance of NLP Models									
LO 3: Understand more key techniques	**3.1**	**Explain** the basics of text preprocessing and sentiment analysis.									
	3.2	**Describe** the steps required in NLP situation, such as Text Classification Model/techniques, Named Entity Recognition (NER) Techniques, etc.									
	3.3	**Implement** Sentient analysis on a given text dataset.									
LO 4 Implement NLP using both python and no-code AI (Project)	**4.1**	**Perform** Text Tokenization using python programming and no-code AI platforms.									
	4.2	**Implement** sentient analysis on a given text dataset using Python script.									
	4.3	**Execute** Named Entity Recognition (NER) using python programming and no-code AI platforms.									

Learner's Signature	Date:
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Unit 010: Fundamentals of Computer/Machine Vision

Unit Reference Number: ICT/AI/010/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *Train learners in the application of AI to image and video data, focusing on tasks such as object detection, image recognition, and video analysis.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 010: FUNDAMENTALS OF COMPUTER/MACHINE VISION

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand the concept of computer vision	**1.1**	**Explain** the basic concepts in computer vision									
	1.2	**Describe** various computer vision techniques and their applications									
	1.3	**Demonstrate** Simple Image Processing Tasks									
LO 2: Understand Computer Vision Algorithms	**2.1**	**Identify** Core Computer Vision Algorithms									
	2.2	**Implement** 2.1									
	2.3	**Evaluate** the Performance from 2.1.									
LO 3: Develop Models of Computer/Machine Vision	**3.1**	**Create** a simple image classification model using neural networks.									
	3.2	**Develop** Face Detection with python, or OpenCV, YOLO, etc.									
	3.3	**Implement** Object Detection using python, or Pre-Trained YOLOv3, Microsoft Azure ML Studio, etc.									

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Unit 011: Fundamentals of Generative AI

Unit Reference Number: ICT/AI/011/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose: *The learner will gain comprehensive understanding of generative AI, including the principles behind generative models, their applications, and the ability to design, train, and evaluate generative AI systems.*

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 011: FUNDAMENTALS OF GENERATIVE AI

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Understand Generative Artificial Intelligence	1.1	**Explain** the Core Concepts of Generative AI									
	1.2	**Describe** the basic components and functioning of generative models.									
	1.3	**Explain** the differences between generative and discriminative models.									
LO 2: Examine the various Applications of Generative AI	**2.1**	**Identify** various applications of generative AI in diverse fields									
	2.2	Describe Applications of Generative AI									
	2.3	**Evaluate** the Impact of Generative AI Applications									
LO 3: Demonstrate Practical Use of Generative AI Tools	3.1	**Develop** Images using a Pre-Trained Generative Adversarial Network (GAN)									
	3.2	**Develop** Text using GPT-3 (or similar model)									
	3.3	**Create** Art using a Style Transfer Model									

Learner's Signature	Date:
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