REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

COMPUTER SCIENCE

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0613 554 A.

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

ARTIFICIAL INTELLIGENCE CONCEPTS

ISCED UNIT CODE: 0613 554 12A

UNIT CODE: ICT/CU/CS/CC/04/6/MA

Relationship to Occupational Standards

This unit addresses the unit of competency: Implement Artificial Intelligence Concepts

Duration of Unit: 180 hours

Unit Description

This unit covers the competencies required to understand artificial intelligence. It involves understanding fundamentals of Artificial Intelligence, understanding problem solving techniques, understanding Python programming environment and developing Artificial Intelligence programs using Python.

Summary of Learning Outcomes

Learning outcomes	Duration (hours)
1. Fundamentals of Artificial Intelligence	30
2. Problem solving techniques	40
3. Python programming environment	60
4. Artificial Intelligence programs using python	50
TOTAL	**180**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Concepts of Artificial Intelligence	1.1 Fundamentals Artificial Intelligence 1.2 History of Artificial Intelligence 1.3 Foundations of Artificial Intelligence	• Oral tests • Written tests • Practical tests

	1.3.1 Mathematics 1.3.2 Economics 1.3.3 Decision Theory 1.3.4 Neurology 1.3.5 Engineering 1.3.6 Psychology 1.3.7 Computer Networking 1.4 Applications of Artificial Intelligence 1.4.1 Expert systems 1.4.2 Machine Learning 1.4.3 Natural Language Processing 1.4.4 Gaming 1.4.5 Artificial Neural Networks 1.4.6 Computer Vison 1.5 Intelligence agents 1.6 Recognising Artificial Intelligence applications in real life	
2. Problem solving techniques	2.1 Logical operators 2.1.1 AND 2.1.2 OR 2.1.3 NOT 2.2 Prepositional Logic and Predicate logic 2.3 Types of inferencing 2.3.1 Single Inferencing 2.3.2 Multiple inferencing 2.3.3 Case based reasoning 2.4 Machine Learning 2.5 Types of Machine Learning	• Oral tests • Written tests • Practical tests •

	2.5.1 Supervised Machine Learning 2.5.2 Unsupervised Machine Learning 2.6 Recognising applications of different types of inferencing	
3. Python programming environment	3.1 Installation of Python 3.1.1 Downloading Python Set Up 3.1.2 Running Python Set Up 3.2 Python syntax 3.2.1 The Zen of Python 3.2.2 Python Enhancement Proposals 8 (PEP 8) 3.2.3 Variable declaration. 3.2.4 Commenting 3.3 Python data types 3.3.1 Integer 3.3.2 Float 3.3.3 Boolean 3.3.4 Set 3.3.5 Dictionary 3.3.6 Tuple 3.3.7 List 3.3.8 String 3.4 Control structures in Python 3.4.1 Selection 3.4.2 Looping 3.5 Functions in Python 3.5.1 Built-in functions 3.5.2 User defined functions 3.5.3 Lambda functions 3.6 Object Oriented Python	• Oral tests • Written tests • Practical tests

	3.6.1 Creation of classes 3.6.2 Class variables 3.6.3 Class methods 3.7 Scientific Modules in Python 3.7.1 Pandas 3.7.2 Numpy 3.7.3 Matplotlib 3.8 Creation of applications using Scientific Modules	
4. Artificial Intelligence programs development using python	4.1 Sci-Kit Learn 4.2 Machine Learning with K-Nearest Neighbours 4.2.1 Mathematics behind K-Nearest Neighbours 4.2.2 Making Predictions with K-Nearest Neighbours 4.3 Machine Learning with Naïve Bayes Algorithm 4.3.1 Mathematics behind Naïve Bayes Algorithm 4.3.2 Making predictions with Naïve Bayes Algorithm	• Oral tests • Written tests • Practical tests

Suggested Methods of Instruction

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised practical assignments and projects
- Visiting lecturer/trainer from the Computer Science sector;
- Industrial visits.

Recommended Resources for 25 trainees

S/No.	Category	Item Description / Specifications	Quantity	Recommended Ratio (Trainee:Item)
1.	**Learning Materials**	Textbooks	25 Books	1:1
2.		Handouts/slides	25 Sets	1:1
3.		Online course subscriptions for AI and Python	25 Licenses	1:1
4.		Python documentation and cheat sheets (print or digital)	25 Copies	1:1
5.	**Learning Facilities**	Classroom / ICT Lab with whiteboard, projector, speakers	1 Room	Shared
6.		Internet-enabled environment	1 Setup	Shared
7.	**Infrastructure**	High-speed internet connection	1 Connection	Shared
8.		Power backup	1 System	Shared

9.	**Tools & Equipment**	Laptops or desktop computers (Python 3.9+ compatible)	25 Units	1:1
10.		Pre-installed Python	Installed	N/A
11.		Libraries	Installed	N/A
12.		External storage	25 Devices	1:1
13.	**Consumable Materials**	Notebooks, pens,	25 Sets	1:1
14.		Assessment forms, quizzes, worksheets	25 Sets	1:1