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IT LEARNERSHIPS

ARTIFICIAL INTELLIGENCE SOFTWARE DEVELOPER

QUALIFICATION 118792
LEARNERSHIP Q-NUMBER: 32Q320159262095

Designed to support your Workplace Skills Plan and build job-ready IT capability

Build AI capability that drives innovation and efficiency

Artificial Intelligence is reshaping how organisations operate, from automation to advanced problem-solving. The need for AI-enabled capability continues to grow.

This qualification builds practical capability to develop, train, and deploy AI-powered applications. Learners gain the skills to integrate machine learning into software and build intelligent solutions that adapt and improve.

Whether learners are starting out, moving into tech, or looking to specialise in a high-demand field, this qualification opens the door to roles like AI Developer, Machine Learning Developer or AI Software Engineer.

QCTO

On successful completion of this qualification, learners are awarded: **Occupational Certificate: Artificial Intelligence Software Developer (SAQA ID: 118792)**

We work closely with you to understand your objectives, guide you through the requirements, and support the implementation of qualifications that deliver real impact.

NQF LEVEL **5**

CREDITS **209**

WHO SHOULD ENROL?

- Individuals starting a career in software development or AI
- School leavers interested in coding and intelligent technologies
- Professionals looking to move into AI or machine learning roles
- Organisations investing in AI and automation capability, or developing intelligent or data-driven solutions
- Employers looking to future-proof digital capability

WHAT MAKES THIS COURSE DIFFERENT?

This programme is designed to move you from learning to doing

- Build strong foundations in AI, machine learning and software development
- Apply your skills in practical, hands-on development environments
- Gain experience developing, training and deploying AI solutions

WHAT IS THE ENTRY CRITERIA?

- Grade 12

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ARTIFICAL INTELLIGENCE SOFTWARE DEVELOPER

QUALIFICATION

The purpose of this qualification is to prepare a learner to operate as an Artificial Intelligence Software Developer. Artificial Intelligence Developers build AI functionality into software applications through integrating and implementing AI algorithms and logic into the deliverables of an IT project. Developers teach the machine to solve problems the way a human would through the use of programming. They create, test, and deploy code. These developers also assist in converting machine learning APIs so that other applications can use them.

Skills your teams will build

These skill level outcomes show what learners will be able to do:

- Interpret solution design documentation and develop AI solution
- Train the AI model through a machine learning process and test the performance to ensure that model accuracy is strictly maintained within the selection framework
- Deploy the AI solution and maintain the solution to ensure model accuracy is strictly maintained

Recognised, quality-assured qualification

Learners undergo internal assessment across the knowledge, practical, and workplace modules, all of which are formally assessed and moderated, in line with QCTO requirements. Successful completion of all components ensures that learners are EISA-ready for the External Integrated Summative Assessment.

To obtain the qualification, learners must pass the External Integrated Summative Assessment (EISA), conducted at an Accredited Assessment centre under the oversight of an Assessment Quality Partner (AQP). The EISA evaluates learners' competence against the qualification's Exit Level Outcomes through integrated written, practical, and/or work-based assessment methods, in line with approved external assessment specifications.

Let's partner for impact!

Our approach combines a deep understanding of your objectives with expert guidance on QCTO programmes, ensuring smooth implementation and meaningful impact in the workplace.

We'll help you get clear on the holistic implementation process

From first conversation to final assessment, you'll be supported by a team that understands how to make QCTO programmes work in practice.

Delivered your way

- Classroom | Johannesburg
- Virtual | Instructor-led
- On-site | Nationwide

Contact us to start your journey!

imactful@lrmg.co.za
impactful.co.za

An environment that enables your learning journey

To ensure a successful learning journey, learners are supported by the right tools, systems, and experienced mentors within a structured environment that aligns with workplace standards. Everything is designed to help learners learn, practice, and perform with confidence.

Physical Requirements

- Tools, equipment, systems, e.g.: company systems, documents, data, relevant meetings, teams and supervisors, AI Solution Development, Modification and Improvement etc.
- Key processes, e.g.: AI design, testing and deployment processes project on the go or completed

Human Resource Requirements

- Maximum mentor/learner ratio of 1:3 in the ideal situation
- Supervisor/mentor: 2 years' software development experience

Legal Requirements

- Legal (product) licences to use software.
- OHS compliance certificate.
- Ethical clearance (where necessary)

ARTIFICAL INTELLIGENCE SOFTWARE DEVELOPER

QUALIFICATION

This detailed overview outlines how the qualification is structured to develop capability progressively – from foundational knowledge, through applied practical skills, to integrated workplace experience. Each module is aligned to the credit requirements of the nationally recognised qualification

KNOWLEDGE MODULES (86 CREDITS)

ID	Name	Level	Credits
251201002-KM-01	**Overview of Artificial Intelligence**	**4**	**2**
The main focus of the learning in this knowledge module is to build an understanding of artificial Intelligence, its definition and future, as well as the purpose and contribution of AI to society and business The learning will enable learners to demonstrate an understanding of:			
KM-01-KT01	Introduction to AI		
KM-01-KT02	Background to AI		
KM-01-KT03	Strategic advantage of AI in business		

ID	Name	Level	Credits
251201002-KM-02	**Introduction to Mathematics and Statistics**	**4**	**10**
The main focus of the learning in this knowledge module is to revise and acquire mathematical and statistical theory to successfully understand and interpret actions of Artificial Intelligence, Machine Learning, Deep Learning and Data Analytics The learning will enable learners to demonstrate an understanding of:			
KM-02-KT01	Basic Mathematics		
KM-02-KT02	Linear Algebra		
KM-02-KT03	Conversion between decimal and binary systems		
KM-02-KT04	Expressing size and magnitude		
KM-02-KT05	Error in calculations		
KM-02-KT06	Cartesian coordinate system		
KM-02-KT07	Pythagorean theorem		
KM-02-KT08	Increments		
KM-02-KT09	Calculus		
KM-02-KT10	Probabilities		
KM-02-KT11	Statistics		
KM-02-KT12	Bayes' Theorem		

ID	Name	Level	Credits
251201002-KM-03	Analytical Thinking and Problem Solving	4	3
The main focus of the learning in this knowledge module is to provide the learner with an opportunity to acquire theory for formulating a problem and applying knowledge to design and create a solution for such a problem The learning will enable learners to demonstrate an understanding of:			
KM-03-KT01	Introduction to analytical thinking		
KM-03-KT02	Problem solving and critical thinking		
KM-03-KT03	AI problem solving		

ID	Name	Level	Credits
251201002-KM-04	Data, Databases and Data Visualisation	4	8
The main focus of the learning in this knowledge module is to build an understanding of data and databases and giving meaning to data through data processing, analysis and visualisation The learning will enable learners to demonstrate an understanding of:			
KM-04-KT01	Introduction to data		
KM-04-KT02	Data in spreadsheets		
KM-04-KT03	Data analytics		
KM-04-KT04	Introduction to databases		
KM-04-KT05	Data mining		
KM-04-KT06	Structured query language (SQL)		
KM-04-KT07	Visualising data with AI tools		
KM-04-KT08	Data security		

ID	Name	Level	Credits
251201002-KM-05	Computing Theory	4	8
The main focus of the learning in this knowledge module is to build an understanding of programming as creating a set of instructions for a computer on how to perform a task, using coding and programming languages The learning will enable learners to demonstrate an understanding of:			
KM-05-KT01	Introduction to programming languages		
KM-05-KT02	Introduction to algorithms		
KM-05-KT03	Programming basics		
KM-05-KT04	Solution development		
KM-05-KT05	Introduction to Python		

ID	Name	Level	Credits
251201002-KM-06	Introduction to Artificial Intelligence, Machine Learning, Deep Learning	4	5
The main focus of the learning in this knowledge module is to build an understanding of the relationship between Artificial Intelligence, Machine Learning and Deep Learning, as well as the application of such systems to create a set of instructions to perform a programming task The learning will enable learners to demonstrate an understanding of:			
KM-06-KT01	Artificial Intelligence (AI) vs Machine Learning (ML) vs Deep Learning (DL)		

ID	Name	Level	Credits
251201002-KM-07	Artificial Intelligence	5	12
The main focus of the learning in this knowledge module is to build an understanding of the relationship between Artificial Intelligence, Machine Learning and Deep Learning, as well as the application of AI to create a set of instructions to perform a programming task The learning will enable learners to demonstrate an understanding of:			
KM-07-KT01	AI frameworks		
KM-07-KT02	Using AI for data scraping		

ID	Name	Level	Credits
251201002-KM-08	Machine Learning	5	16
The main focus of the learning in this knowledge module is to build an understanding of the relationship between Artificial Intelligence, Machine Learning and Deep Learning, as well as the application of ML to create a set of instructions to perform a programming task The learning will enable learners to demonstrate an understanding of:			
KM-08-KT01	Types of ML models		
KM-08-KT02	ML algorithm classification		
KM-08-KT03	Common ML algorithms		
KM-08-KT04	ML Workflow Process (Framework)		
KM-08-KT05	Business benefits of ML		

ID	Name	Level	Credits
251201002-KM-09	Deep Learning	5	16
The main focus of the learning in this knowledge module is to build an understanding of the relationship between Artificial Intelligence, Machine Learning and Deep Learning, as well as the application of Deep Learning to create a set of instructions to perform a programming task using a Deep Learning tool The learning will enable learners to demonstrate an understanding of:			
KM-09-KT01	Deep Learning (DL)		
KM-09-KT02	Advance Python for Deep Learning		
KM-09-KT03	TensorFlow and Keras for Deep Learning		

ID	Name	Level	Credits
251201002-KM-10	**Introduction to Governance, Legislation and Ethics**	**4**	**1**
The main focus of the learning in this knowledge module is to build an understanding of the various legislations governing the workplace and their implication for the employer and employees. The learning of this module will also enable the learner to acquire an understanding of the principles of areas of performance management, business planning concepts, costing of products and concepts of general ethical behaviour and its impact in the workplace The learning will enable learners to demonstrate an understanding of:			
KM-10-KT01	Governance		
KM-10-KT02	Legislation governing workplaces		
KM-10-KT03	Introduction to ethics and security		
KM-10-KT04	Ethics at work		
KM-10-KT05	Security		
KM-10-KT06	Performance management		
KM-10-KT07	Business planning		
KM-10-KT08	Costing of products		
KM-10-KT09	Resources		

ID	Name	Level	Credits
251201002-KM-11	**Fundamentals of Design Thinking and Innovation**	**4**	**1**
The main focus of the learning in this knowledge module is to build an understanding of the design thinking principles and applications in the workplace The learning will enable learners to demonstrate an understanding of:			
KM-11-KT01	Introduction to design thinking		
KM-11-KT02	The human element		
KM-11-KT03	Creativity		
KM-11-KT04	Innovation		
KM-11-KT05	Design		
KM-11-KT06	Design thinking methodology		
KM-11-KT07	Application of design thinking		

ID	Name	Level	Credits
251201002-KM-12	**4IR and Future Skills**	**4**	**4**
The main focus of the learning in this knowledge module is to build an understanding of the impact of 4IR on communities, individuals and businesses as well as important skills for future needs The learning will enable learners to demonstrate an understanding of:			
KM-12-KT01	4 IR emerging trends		
KM-12-KT02	Computing Knowledge		
KM-12-KT03	Future skills and competencies (4IR)		
KM-12-KT04	4 IR trends affecting businesses		
KM-12-KT05	Interpersonal skills		
KM-12-KT06	Intrapersonal skills		
KM-12-KT07	Communication principles and methods		
KM-12-KT08	Written business communication		
KM-12-KT09	Presentation skills		
KM-12-KT10	Teamwork in the workplace		
KM-12-KT11	Committees and meetings		
KM-12-KT12	Job descriptions and profiles		
KM-12-KT13	Customers and stakeholders		
KM-12-KT14	Customer service		

PRACTICAL SKILL MODULES (63 CREDITS)

ID	Name	Level	Credits
251201002-PM-01	**Mathematics and Statistics for Programming**	**4**	**8**
The focus of the learning in this module is on applying the mathematical and statistical theory learned successfully and to interpret such skills in terms of action for Artificial Intelligence, Machine Learning, Deep Learning and Data Analytics The learner will be required to:			
PM-01-PS01	Apply basic mathematics		
PM-01-PS02	Apply linear algebra		
PM-01-PS03	Convert decimal into binary systems		
PM-01-PS04	Express size and magnitude		
PM-01-PS05	Fix errors in calculations		
PM-01-PS06	Apply Cartesian coordinate system		
PM-01-PS07	Apply Pythagorean theorem		
PM-01-PS08	Use increments		
PM-01-PS09	Use calculus		
PM-01-PS10	Use probabilities		
PM-01-PS11	Apply statistical calculations		
PM-01-PS12	Apply Bayes' Theorem		
Associated Knowledge Module: KM-02 Introduction to Mathematics and Statistics			

ID	Name	Level	Credits
251201002-PM-02	**Problem Definition, Analytical Thinking and Decision-Making**	**4**	**2**
The focus of the learning in this module is on using the opportunity to apply analytical thinking skills to formulating a problem and use knowledge to design and create a solution for such a problem The learner will be required to:			
PM-02-PS01	Apply analytical thinking skills		
PM-02-PS02	Apply problem solving and critical thinking skills		
PM-02-PS03	AI Problem Solving		
Associated Knowledge Module: KM-03 Analytical Thinking and Problem Solving			

ID	Name	Level	Credits
251201002-PM-03	**Access, Analyse and Visualise Structured Data Using Spreadsheets**	**4**	**4**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to use spreadsheets to analyse and visualise data and databases through data processing, analysis and visualisation The learner will be required to:			
PM-03-PS01	Source, refine, clean and analyse data		
PM-03-PS02	Analyse and visualise data using spreadsheets		
PM-03-PS03	Analyse and report data presented in a database		
PM-03-PS04	Use data mining to source and present data		
PM-03-PS05	Visualising data with AI tools		
Associated Knowledge Module: KM-04 Data, Databases and Data Visualisation			

ID	Name	Level	Credits
251201002-PM-04	**Use SQL to Communicate with a Database**	**5**	**4**
The focus of the learning in this module is on providing the learner with an opportunity to display the skills required to use SQL to communicate with a database and to perform a database transaction The learner will be required to:			
PM-04-PS01	Apply Structured Query Language (SQL) to perform a database transaction		
Associated Knowledge Module: KM-04 Data, Databases and Data Visualisation			

ID	Name	Level	Credits
251201002-PM-05	**Build a simple AI solution using Python**	**5**	**8**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to apply basic programming skills and code to use a software toolkit/platform in the field of study or employment The learner will be required to:			
PM-05-PS01	Install Python on a PC		
PM-05-PS02	Identify a problem		
PM-05-PS03	Prepare data		
PM-05-PS04	Choose AI Learning category		
PM-05-PS05	Train model		
PM-05-PS06	Select an ML system		
PM-05-PS07	Run AI implementation		
Associated Knowledge Module: KM-05 Computing Theory			

ID	Name	Level	Credits
251201002-PM-06	**Use Python Data Scraping to Populate Database Table in SQL**	**5**	**4**
The focus of the learning in this module is on providing the learner with an opportunity to display the skills required to use data scraping to populate a database table in SQL The learner will be required to			
PM-06-PS01	Apply Python to scrape data in a database using Structured Query Language (SQL)		
Associated Knowledge Module: KM-05 Computing Theory			

ID	Name	Level	Credits
251201002-PM-07	**Use Machine Learning to Build an AI solution in Python**	**5**	**6**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to build an AI solution in Python that can solve a real-life problem The learner will be required to:			
PM-07-PS01	Identify a problem		
PM-07-PS02	Prepare data		
PM-07-PS03	Choose AI Learning category		
PM-07-PS04	Train model		
PM-07-PS05	Select an ML system		
PM-07-PS06	Run AI implementation		
PM-07-PS07	Turn prototype solution into an economically viable product		
Associated Knowledge Module: KM-08 Machine Learning			

ID	Name	Level	Credits
251201002-PM-08	**Use Deep Learning to Build an AI Neural Network Architecture in Python**	**5**	**10**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to build an AI neural network architecture in Python that will solve a real-life problem The learner will be required to:			
PM-08-PS01	Identify a problem		
PM-08-PS02	Prepare data		
PM-08-PS03	Choose AI Learning category		
PM-08-PS04	Train model		
PM-08-PS05	Select an ML system		
PM-08-PS06	Run AI implementation		
PM-08-PS07	Turn prototype solution into an economically viable product		
Associated Knowledge Module: KM-09 Deep Learning			

ID	Name	Level	Credits
251201002-PM-09	**Use Deep Learning to Build an AI Neural Network Architecture in TensorFlow**	**5**	**10**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to build an AI neural network architecture in TensorFlow that will solve a real-life problem The learner will be required to:			
PM-09-PS01	Identify a problem		
PM-09-PS02	Prepare data		
PM-09-PS03	Choose AI Learning category		
PM-09-PS04	Train model		
PM-09-PS05	Select an ML system		
PM-09-PS06	Run AI implementation		
PM-09-PS07	Turn prototype solution into an economically viable product		
Associated Knowledge Module: KM-09 Deep Learning			

ID	Name	Level	Credits
251201002-PM-10	**Function Ethically and Effectively as a Member of a Multidisciplinary Team**	**4**	**3**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to function ethically and effectively in the workplace The learner will be required to:			
PM-10-PS01	Present information to an audience		
PM-10-PS02	Conduct basic research (gather and explore data and information) on 4IR skills and application opportunities in the workplace		
PM-10-PS03	Ensure compliance with the code of conduct and governance in the workplace		
PM-10-PS04	Collaborate with team members in the workplace		
PM-10-PS05	Attend and participate in meetings		
Associated Knowledge Module: KM-12 4IR and Future Skills			

ID	Name	Level	Credits
251201002-PM-11	Participate in a Design Thinking for Innovation Workshop	4	4
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to participate in a design thinking intervention, apply design thinking methodologies and look for opportunities to apply the same methodology in world-of-work and personal life The learner will be required to:			
PM-11-PS01	Collaborate with team members to apply innovative and problem-solving strategies		
PM-11-PS02	Apply design thinking process to solve a problem creatively and innovatively		
Associated Knowledge Module: KM-11 Fundamentals of Design Thinking and Innovation			

WORK EXPERIENCE MODULES (60 CREDITS)

ID	Name	Level	Credits
251201001-WM-01	AI Solution Design Interpretation and Development	5	20
The focus of the work experience is on providing the learner with an opportunity to interpret a real-life world problem and build AI solutions which are more sensitive to user behaviour and changes in their environments The learner will be required to:			
WM-01-WE01	Attend induction program and familiarise self with company processes, procedures, tools and culture • Attend induction program and familiarise self with the culture of the company • Apply protocols and work etiquette • Attend company specific information sharing sessions (e.g., standing meetings, toolbox talks, power hours, etc.) • Familiarise self with and apply "working from anywhere" protocols • Comply with governance protocols and code of ethics of the company and ensure legal compliance by adhering to legal requirements (incl. but not limited to privacy, confidentiality, security of data, etc.) • Spend time in the various departments of the company, observe process flows and compile wire diagrams or workflow of the processes observed using suitable tools • Understand the change management process when taking the change into the production system • Manage timesheets and apply self-management skills • Analyse workflow diagram which describes the business process and validate whether the thinking was correct • Collaborate with team members to achieve common and individual goals		
WM-01-WE02	Scrape data using a suitable tool e.g., SQL • Identify source and destination data • Find the URL to scrape • Inspect the page • Find the data to extract • Write the code • Run the code and extract the data • Store the data in the required format and specified libraries		

ID	Name	Level	Credits
251201001-WM-01	**AI Solution Design Interpretation and Development**	**5**	**20**
WM-01-WE03	Review existing AI solutions • Review AI solutions employed by the organisation • Analyse and interpret industry specific AI solutions • Compare solutions and determine gaps, problems and possible solutions • Investigate programming tools and platforms used by the organisation for AI		
WM-01-WE04	Analyse the SDD for the AI solution and prepare the technical design documentation • Analyse the solution design document (SDD) for identification of the process and objects • Analyse the workflow of the business process and identify the interaction between different components of the AI solution • Analyse deployment related specifications • Analyse the impact of AI solution related decisions on business and organization • Compile the technical design document according to company specifications and update where necessary to incorporate changes according to continuous improvement protocols		
WM-01-WE05	Scrape and analyse data for application • Conduct data scraping • Perform data analysis to understand and identify the types of variables, arrays and dictionaries (since AI bots transform complex, unstructured data sets into organized, automated tasks)		
WM-01-WE06	Develop smarter, friendlier and more sensitive AI solutions in accordance with the design documents and company quality standards, applying best practices • Select suitable tools for the AI solution in accordance with the design documents • Apply the most suitable algorithms for a machine learning application • Generate the software code for each component of AI solution using a modular approach so that codes can be reused • Integrate various modules of the AI solution • Apply best practices and quality standards during coding to ensure compliance with internal control or audit requirements • Plan and organise the work to achieve targets and deadlines using Agile or similar methodologies • Coordinate with cross-functional teams using Agile or similar methodologies • Document the code and include applicable information • Apply error handling techniques to achieve accuracy standards of the company. Check the work is complete and free of errors • Strictly adhere to version control procedures		

ID	Name	Level	Credits
251201001-WM-02	**AI Solution Performance Testing**	**5**	**20**
The focus of the work experience is on providing the learner with an opportunity to problem-solve issues (post-production) that arise in day to day running of AI processes and to provide timely responses and solutions as required. The learner will be required to:			

WM-02-WE01	Assist with the preparation of test cases for the AI solution
	• Define the type of testing and testing requirements for the AI solution applying various criteria
	• Evaluate and select the best testing tool for a specific purpose
	• Search the organization's knowledge base for reusable scenarios, test cases, scripts and tools
	• Access, create and modify different types of:
	  ○ test cases
	  ○ automated scripts
	  ○ test data
	  ○ test plans
	• Create or modify suitable test cases according to requirements and suitable to specific applications
	• Check whether test cases are suitable to be automated and create or modify scripts
	• Identify issues that may occur with the testing requirements and address
	• Access or create test data according to the requirements
	• Apply procedures to check that the tests are working according to requirements
	• Run the simulated test cases		

WM-02-WE02	Take remedial action to address any exception from the desired outcomes • Identify inconsistencies with desired output • Analyse outcomes and apply findings to improve test cases • Continue the debugging and logging processes until the AI solution runs without errors • Compile documentation on the tests or simulations		
WM-02-WE03	Resolve workflow incidents related to the AI solution through troubleshooting and fixing bugs • Log the incident using the company system • Analyse the error and determine the cause, e.g., the tool, the AI solution or application • Debug the code using suitable methods • Identify the line of code where the bug occurred • Identify the bug type and fix the error in the code • Analyse logged activities • Apply problem-solving approaches in different situations • Continue the debugging and logging processes until the AI solution runs without errors • Report unresolved issues to AI vendor or other relevant team members		

ID	Name	Level	Credits
251201001-WM-03	**AI Solution Deployment, Modification and Improvement**	**5**	**20**
The focus of the work experience is on providing the learner with an opportunity to assist with the deployment of AI solutions for business process automation and maintain, modify and improve such solutions. The learner will be required to:			
WM-03-WE01	Assist the team to deploy the AI solution • Schedule times that the bots must run as per design specifications (coding) for unattended robots • Deploy the solution into the production environment (Go live) • Update process documentation • Enable AI users (if necessary), to understand how the automation works and how they should interact with the AI solution (attended robots – human triggers) on business need basis • Monitor the bot status through auditing logs and dashboards • Import and export AI solutions		
WM-03-WE02	Investigate opportunities for the modification and improvement of the AI solution • Troubleshoot problems and performance of the AI solution • Investigating and documenting better practices and alternative solutions that could be used in future development (new requirements) • Update and maintain developer standards (best practice) around AI best practices to adapt due to regulatory and market pressures • Explore and identify process improvements that can simplify the process and make it more understandable, therefore reducing the necessary programming and auditing effort and improving customer experience		
WM-03-WE03	Maintain and update the AI solution to incorporate improvements and changes • Update robotic workflows should the company (client) update its AI software version • Implement enhancements and introduce updates to already automated processes • Implement change requests to already automated processes		