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ASSESSMENT QUALITY PARTNER
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IT LEARNERSHIPS

SOFTWARE DEVELOPER

QUALIFICATION 118707
LEARNERSHIP Q-NUMBER: 32Q320167302205

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

Turn ideas into working software

Software underpins how modern organisations operate, from internal systems to customer-facing platforms. As demand grows, so does the need for developers who can design, build, and maintain reliable solutions.

This Software Developer learnership builds practical capability in your teams to turn requirements into working applications. Learners develop the skills to design, develop, and maintain software that solves real business problems.

Whether learners are starting out, moving into tech, or looking to build a future-ready career, this qualification opens the door to roles like Software Developer, Junior Developer or Application Developer.

QCTO

On successful completion of this qualification, learners are awarded: **Occupational Certificate: Software Developer (SAQA ID: 118707)**

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 **220**

WHO SHOULD ENROL?

- Individuals starting a career in IT or software development
- School leavers interested in coding and technology
- Professionals looking to transition into development roles
- Teams building software development capability or developing internal or customer-facing systems

WHAT MAKES THIS COURSE DIFFERENT?

This programme is designed to move you from learning to doing

- Build strong foundations in programming and software development
- Apply your skills in practical, hands-on, simulated environments
- Gain real-world experience developing and testing software solutions

WHAT IS THE ENTRY CRITERIA?

- Grade 12

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SOFTWARE DEVELOPER

QUALIFICATION

A Software Developer analyses a set of requirements, translates these into a working software solution using a programming language. They test, implement and maintain software applications to meet client specifications as well as functional and technical requirements.

Skills your teams will build

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

- Interrogate the specification and problem and interpret it into code and articulate in writing
- Build a logical flow using the framework and methodologies at their disposal to propose possible solutions to business challenges
- Programme effectively using a suitable programming language to develop and test new solutions and update existing solutions

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.

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, practise, and perform with confidence.

Physical Requirements

- Tools, equipment, systems, e.g.: company systems, documents, data, relevant meetings, teams and supervisors, design studio, etc.
- Key processes, e.g.: RPA design, testing and deployment processes project on the go or complete

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)

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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 (66 CREDITS)

ID	Name	Level	Credits
251201005-KM-01	**Computers and Computing Systems**	**4**	**12**
The main focus of the learning in this knowledge module is to build an understanding of what computers can do and the processes that make them function in terms of the four major parts: input, output, CPU (central processing unit) and memory. It gives an overview of networks and connectivity as well as security issues pertaining to IT ecosystems. The learning will enable learners to demonstrate an understanding of:			
KM-01-KT01	Problem solving skills for IT Professionals		
KM-01-KT02	Techniques for safety		
KM-01-KT03	System components		
KM-01-KT04	Motherboards		
KM-01-KT05	Processors		
KM-01-KT06	Memory		
KM-01-KT07	BIOS and CMOS		
KM-01-KT08	Hard drives and storage devices		
KM-01-KT09	Power supplies and voltage		
KM-01-KT10	Ports, cables, and connectors		
KM-01-KT11	Networking and network operating systems		
KM-01-KT12	Networking and wireless connections		
KM-01-KT13	Input and output devices		
KM-01-KT14	Installing and managing printers		
KM-01-KT15	Mobile devices, multimedia, and laptop computers		
KM-01-KT16	Preventative maintenance		
KM-01-KT17	Troubleshooting procedures		
KM-01-KT18	Operating systems		
KM-01-KT19	Managing files		
KM-01-KT20	Applications utility, troubleshooting, and optimization		
KM-01-KT21	Configuring device drivers		
KM-01-KT22	Recovery		
KM-01-KT23	Cloud computing		
KM-01-KT24	Security fundamentals		
KM-01-KT25	Programming and development		

ID	Name	Level	Credits
251201005-KM-02	**Desktop and Professional Software to Communicate and Visualise Information**	**4**	**8**
The main focus of the learning in this knowledge module is to build an understanding of the functioning and purpose of information, computer technology and computer hardware units. The learning of this module will also enable the learner to acquire an understanding of the principles of electronic communication and the operation and functioning of software packages, including the design of presentations The learning will enable learners to demonstrate an understanding of:			
KM-02-KT01	Electronic Communication		
KM-02-KT02	Software Apps for office use		
KM-02-KT03	Operating a software package		
KM-02-KT04	Text documents using an appropriate software package		
KM-02-KT05	Presentations using and appropriate software package		

ID	Name	Level	Credits
251201005-KM-03	**Automated Web scraping as a Data Source**	**5**	**8**
The main focus of the learning in this knowledge module is to build an understanding of the design aspect applicable to various types of publications and documents The learning will enable learners to demonstrate an understanding of:			
KM-03-KT01	Sources of data		
KM-03-KT02	Web scraping and access to accurate data		
KM-03-KT03	Big Data		
KM-03-KT04	Data quality		
KM-03-KT05	Best practices for data governance		
KM-03-KT06	Legislation (e.g. POPI Act)		
KM-03-KT07	Wrangling		
KM-03-KT08	Data structures		

ID	Name	Level	Credits
251201005-KM-04	**Logical Thinking and Basic Calculations**	**4**	**2**
The main focus of the learning in this knowledge module is to acquire mathematical thinking theory for solving problems and acquire basic maths knowledge for use during data analytics The learning will enable learners to demonstrate an understanding of:			
KM-04-KT01	Mathematical thinking skills for problem solving		
KM-04-KT02	Conversion between decimal and binary systems		
KM-04-KT03	Expressing size and magnitude		
KM-04-KT04	Error in calculations		
KM-04-KT05	Cartesian coordinate system		
KM-04-KT06	Pythagorean theorem for finding the distance between two points		
KM-04-KT07	Operator precedence		
KM-04-KT08	Integer division		
KM-04-KT09	Modulus		
KM-04-KT10	Increments		
KM-04-KT11	Mixing types		

ID	Name	Level	Credits
251201005-KM-05	Computing Theory	4	2
The main focus of the learning in this knowledge module is to build an understanding of programming as creating a set of instructions to 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	Programming basics		
KM-05-KT03	Software applications		

ID	Name	Level	Credits
251201005-KM-06	Software Development with HTML5, Opensource Frameworks and Libraries	5	16
The main focus of the learning in this knowledge module is to build an understanding of these topics: Core Programming, Object-Oriented Programming, General Software Development, Web Applications, Desktop Applications, Databases, Manage the Application Life Cycle, Build the User Interface by Using HTML5, Format the User Interface by Using CSS, and Code by Using JavaScript The learning will enable learners to demonstrate an understanding of:			
KM-06-KT01	Core programming		
KM-06-KT02	Object-Oriented Programming		
KM-06-KT03	General Software Development		
KM-06-KT04	Web applications		
KM-06-KT05	Applications development		
KM-06-KT06	HTML5		
KM-06-KT07	CSS		
KM-06-KT08	JavaScript		

ID	Name	Level	Credits
251201005-KM-07	UML as Standard Modelling Language for Software and Systems Development	5	4
The main focus of the learning in this knowledge module is to build an understanding of the modelling tools, topics and theory and how modelling assist in focussing on, capturing, documenting and communicating a system design. The Unified Modelling Language (UML) is the standard modelling language for software and systems development The learning will enable learners to demonstrate an understanding of:			
KM-07-KT01	Introduction		
KM-07-KT02	Modelling requirements		
KM-07-KT03	Workflows: activity diagram		
KM-07-KT04	Classes and class diagrams		
KM-07-KT05	Advanced class diagrams		
KM-07-KT06	Object diagrams		
KM-07-KT07	Sequence diagrams		
KM-07-KT08	Communication diagrams		
KM-07-KT09	Timing diagrams		
KM-07-KT10	Interaction overview diagrams		
KM-07-KT11	Classes internal structure: composite structures		
KM-07-KT12	Component diagrams		

ID	Name	Level	Credits
251201005-KM-07	**UML as Standard Modelling Language for Software and Systems Development**	**5**	**4**
KM-07-KT13	Packages		
KM-07-KT14	State machine diagrams		
KM-07-KT15	Deployed diagrams		

ID	Name	Level	Credits
251201005-KM-08	**Obtaining, Querying, Manipulating and Presenting Data with and without MVC**	**5**	**6**
The main focus of the learning in this knowledge module is to acquire general knowledge and understanding of the principles and methods to obtain, query, manipulate and present data with and without MVC. The learning will enable learners to demonstrate an understanding of:			
KM-08-KT01	Understanding core database concepts		
KM-08-KT02	Creating database		
KM-08-KT03	Manipulating data		
KM-08-KT04	Understanding Data		
KM-08-KT05	Administering a database		

ID	Name	Level	Credits
251201005-KM-09	**Software Development Life Cycle, Programming Languages, Algorithms and Security**	**5**	**3**
The main focus of the learning in this knowledge module is to build an understanding of the principles and techniques applied during the SDLC, use of programming languages, design and development of algorithms and the importance of security during the development of software solutions. The learning will enable learners to demonstrate an understanding of:			
KM-09-KT01	Introduction to software development		
KM-09-KT02	Software Development Life Cycle		
KM-09-KT03	The need for a solution		
KM-09-KT04	Popular SDLC models		
KM-09-KT05	Phase 1: Requirement collection and analysis		
KM-09-KT06	Phase 2: Feasibility study		
KM-09-KT07	Phase 3: Design		
KM-09-KT08	Phase 4: Coding		
KM-09-KT09	Phase 5: Testing		
KM-09-KT10	Phase 6: Installation/Deployment		
KM-09-KT11	Phase 7: Maintenance		
KM-09-KT12	Software development logging and commenting		
KM-09-KT13	Programming and programming languages		
KM-09-KT14	Coding		
KM-09-KT15	Overview of algorithms in information technology		
KM-09-KT16	Algorithms		
KM-09-KT17	Programming language concepts and terminology		
KM-09-KT18	Security topics every software developer must know		
KM-09-KT19	Machine learning		

ID	Name	Level	Credits
251201005-KM-10	Introduction to Software Developer Governance, Legislation and Ethics	4	2

The main focus of the learning in this knowledge module is to acquire general knowledge and understanding of the various legislations governing the workplace and their implications 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
251201005-KM-11	4IR and Future Skills	4	2

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 and important skills for future needs

The learning will enable learners to demonstrate an understanding of:

KM-11-KT01	4 IR emerging trends
KM-11-KT02	Computing Knowledge
KM-11-KT03	Future skills and competencies (4IR
KM-11-KT04	4 IR trends affecting businesses
KM-11-KT05	Interpersonal skills
KM-11-KT06	Intrapersonal skills
KM-11-KT07	Communication principles and methods
KM-11-KT08	Written business communication
KM-11-KT09	Presentation skills
KM-11-KT10	Teamwork in the workplace
KM-11-KT11	Committees and meetings
KM-11-KT12	Job descriptions and profiles
KM-11-KT13	Customers and stakeholders
KM-11-KT14	Customer service

ID	Name	Level	Credits
251201005-KM-12	Design Thinking Principles for Innovation4	4	1
The main focus of the learning in this knowledge module is to build an understanding of design thinking principles and application in the workplace The learning will enable learners to demonstrate an understanding of:			
KM-12-KT01	Introduction to design thinking		
KM-12-KT02	The human element		
KM-12-KT03	Creativity		
KM-12-KT04	Innovation		
KM-12-KT05	Design		
KM-12-KT06	Design thinking methodology		
KM-12-KT07	Application of design thinking		

PRACTICAL SKILL MODULES (89 CREDITS)

ID	Name	Level	Credits
251201005-PM-01	Use Software to Communicate and Visualise Information	4	3
The focus of the learning in this module is on providing the learner with an opportunity to develop skills to apply and use information, computer technology and computer software. The learning of this module will also enable the learner to acquire the skills to use electronic communication and soft-ware packages, including compiling text documents and designing of presentations for visualisation of information The learner will be required to:			
PM-01-PS01	Use electronic communication		
PM-01-PS02	Use software packages for office use		
PM-01-PS03	Operate a software package		
PM-01-PS04	Use software functions to create and manage documents		
PM-01-PS05	Design and construct presentations		
Associated Knowledge Module: KM-02 Desktop and Professional Software to Communicate and Visualise Information			

ID	Name	Level	Credits
251201005-PM-02	Use and Manage Spreadsheets and Workbooks	4	3
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 The learner will be required to:			
PM-02-PS01	Use workbooks		
PM-02-PS02	Manipulate data		
PM-02-PS03	Create and work with tables		
PM-02-PS04	Use references and formulas		
PM-02-PS05	Apply functionalities for using macros, referencing, language, collaboration and formatting		
PM-02-PS06	Use formulas in a spreadsheet		
PM-02-PS07	Visualise data using charts		
Associated Knowledge Module: KM-02 Desktop and Professional Software to Communicate and Visualise Information			

ID	Name	Level	Credits
251201005-PM-03	**Use Desktop Applications to Analyse, Visualise and report on Data**	**5**	**3**
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 The learner will be required to:			
PM-03-PS01	Report data using spreadsheets		
PM-03-PS02	Summarise and format data using spreadsheet tables		
PM-03-PS03	Create, use and edit pivot tables and pivot charts		
PM-03-PS04	Create, use and edit dashboards		
PM-03-PS05	Create and configure hierarchies and time data		
PM-03-PS06	Apply a spreadsheet data model		
PM-03-PS07	Import data from files		
PM-03-PS08	Import data from databases		
PM-03-PS09	Import data from reports		
PM-03-PS10	Visualize data		
PM-03-PS11	Scrape data from the web using an appropriate tool		
Associated Knowledge Module: KM-			

ID	Name	Level	Credits
251201005-PM-04	**Use a Visual Analytics Platform and Visualisation Tools to Analyse, Visualise and report on Data**	**5**	**3**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to use Business Intelligence (BI) Technologies to analyse and visualise data (BI toolsets and technologies refer to e.g. Power BI, R, Python, Tableau, Hadoop, Spark, etc.) The learner will be required to:			
PM-04-PS01	Use spreadsheet data with BI technologies		
PM-04-PS02	Self-service BI technology solutions		
PM-04-PS03	Shape and combine data		
PM-04-PS04	Model data		
PM-04-PS05	Use interactive data visualizations to represent data graphically		
PM-04-PS06	Access data		
PM-04-PS07	Use visualisation tools to present data as meaningful insights		
Associated Knowledge Module: KM-			

ID	Name	Level	Credits
251201005-PM-05	**Query and Massage Data**	**5**	**3**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the skills to apply various methods and tools to analyse data and create meaningful insights The learner will be required to:			
PM-05-PS01	Write queries		
PM-05-PS02	Write SELECT queries		
PM-05-PS03	Query multiple tables		
PM-05-PS04	Sort and filter data		
PM-05-PS05	Use SQL server data types		
PM-05-PS06	Use data manipulation language (DML) to modify data		
PM-05-PS07	Use built-in functions		
PM-05-PS08	Group and aggregate data		
PM-05-PS09	Use subqueries		
PM-05-PS10	Use table expressions		
PM-05-PS11	Use set operators		
PM-05-PS12	Use ranking, offset, and aggregate functions		
PM-05-PS13	Write queries using pivoting and grouping sets		
PM-05-PS14	Execute stored procedures		
PM-05-PS15	Program with SQL		
PM-05-PS16	Implement error handling		
PM-05-PS17	Implement transactions		
Associated Knowledge Module: KM-08 Obtaining, Querying, Manipulating and Presenting Data with and without MVC			

ID	Name	Level	Credits
251201005-PM-06	**Apply Logical Thinking and Maths**	**4**	**3**
The focus of the learning in this module is on providing the learner with an opportunity to acquire mathematical thinking skills for solving problems and to acquire basic maths skills for using software toolkits or platforms. Functional understanding of maths and for logical reasoning The learner will be required to			
PM-06-PS01	Number bases and measurement units		
PM-06-PS02	Basic math		
PM-06-PS03	Operator precedence		
PM-06-PS04	Integer division		
PM-06-PS05	Functions, limits and continuity		
PM-06-PS06	Differential calculus of single variable functions		
PM-06-PS07	Modulus		
PM-06-PS08	Increments		
PM-06-PS09	Mixing types		
PM-06-PS10	Casting (timing and contextualising)		
Associated Knowledge Module: KM-04 Logical Thinking and Basic Calculations			

ID	Name	Level	Credits
251201005-PM-07	**Apply Code to use a Software Toolkit/Platform in the Field of Study or Employment**	**5**	**3**
The focus of the learning in this module is on providing the learner with an opportunity to acquire the ability 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-07-PS01	Source and compare at least three software toolkits/platforms/ languages used in your field of studies		
PM-07-PS02	Identify and contrast four (4) paradigms		
PM-07-PS03	Create a programming environment (tailored to a specific tool or platform)		
PM-07-PS04	Write code using a programming language for giving instructions for use of a software toolkit/platform		
PM-07-PS05	Select and use correct data types (tailored to a specific tool or platform)		
PM-07-PS06	Use complex types to organise data (tailored to a specific tool or platform)		
PM-07-PS07	Add API's (Application Programming Interface) to an application (tailored to a specific tool or platform)		
PM-07-PS08	Define a function (tailored to a specific tool or platform)		
PM-07-PS09	Use logical branch statements and comparison operators (tailored to a specific tool or platform)		
PM-07-PS10	Code loops (tailored to a specific tool or platform)		
PM-07-PS11	Use and apply variable scopes (tailored to a specific tool or platform)		
PM-07-PS12	Create queries to pull desired data using a structured query language (SQL) (applicable to data base) (tailored to a specific tool or platform)		
PM-07-PS13	Handle errors and troubleshooting (tailored to a specific tool or platform)		
PM-07-PS14	Identify the general steps for writing code (tailored to a specific tool or platform)		
PM-07-PS15	Execute practical exercises 1, 2 and 3 using the specified product set		
Associated Knowledge Module: KM-05 Computing Theory			

ID	Name	Level	Credits
251201005-PM-08	**Develop Software using HTML5, Opensource Frameworks and Libraries**	**5**	**16**
The focus of the learning in this module is on providing the learner with an opportunity to using HTML5 Opensource frameworks and libraries to implement programming logic, define and use variables, perform looping and branching, develop user interfaces, capture and validate user input, store data, and create well-structured application. The learner will be required to:			
PM-08-PS01	Creating and Styling HTML5 Pages		
PM-08-PS02	Display data and handle events by using JavaScript		
PM-08-PS03	Create forms to collect and validate user input		
PM-08-PS04	Communicate with a remote data source		
PM-08-PS05	Style text and block elements		
PM-08-PS06	Refine code for maintainability and extensibility		
PM-08-PS07	Create interactive pages by using HTML5 APIs		
PM-08-PS08	Add offline support to web applications		
PM-08-PS09	Implementing an adaptive user interface		
PM-08-PS10	Creating advanced graphics		

ID	Name	Level	Credits
251201005-PM-08	**Develop Software using HTML5, Opensource Frameworks and Libraries**	**5**	**16**
PM-08-PS11	Animate the user interface		
PM-08-PS12	Implementing real-time communication by using web sockets		
PM-08-PS13	Create a web worker process		
PM-08-PS14	Package JavaScript for production deployment		
Associated Knowledge Module: KM-06 Software Development with HTML5, Opensource Frameworks and Libraries			

ID	Name	Level	Credits
251201005-PM-09	**Design and Build Web Applications, Desktop Graphical User Interfaces or Mobile Apps**	**5**	**8**
The focus of the learning in this module is on providing the learner with an opportunity to design and create web applications, mobile apps and graphical user interfaces (GUIs), using the Model-View-Controller (MVC) framework as an architectural pattern and to separate an application into three main logical components Model, View, and Controller The learner will be required to:			
PM-09-PS01	Plan a project to build a solution which effectively solve the customer's business problems (project design phase)		
PM-09-PS02	Configure middlewares and services		
PM-09-PS03	Develop controllers for processing web requests		
PM-09-PS04	Develop views to define the user interface for web applications		
PM-09-PS05	Create code to develop MVC models to interact and model various types of data or objects		
PM-09-PS06	Connect an application to a database to access and store data using an object-database mapper to build a database-driven website in MVC		
PM-09-PS07	Build web applications apply a consistent look and feel to the application		
PM-09-PS08	Develop the client-side of a web application using applicable tools		
PM-09-PS09	Test and troubleshoot for bugs that results in exceptions or unexpected behaviour		
PM-09-PS10	Manage security aspects of a web application		
PM-09-PS11	Increase the speed of data access and communication to improve performance		
PM-09-PS12	Implement web APIs to enable and promote application interaction with external systems		
PM-09-PS13	Host and deploy a web application ensuring it is accessible by clients on a wide variety of machines		
Associated Knowledge Module: KM-06 Software Development with HTML5, Opensource Frameworks and Libraries			

ID	Name	Level	Credits
251201005-PM-10	**Use a Cloud Automation Platform to Create Solutions**	**4**	**8**
The focus of the learning in this module is on providing the learner with an opportunity to write code that logically solves a given problem. Learners will learn how to write, debug, maintain and document code and create unique and efficient business solutions by using cloud automation platform tools and functionalities The learner will be required to:			
PM-10-PS01	Leverage business intelligence technology to create business solutions		
PM-10-PS02	Model data using a cloud automation platform functionality		
PM-10-PS03	Apply the capabilities of Power Apps to build various Apps		
PM-10-PS04	Build an automated solution using Power Automate		
PM-10-PS05	Report and visually present data using a cloud automation platform		
PM-10-PS06	Build a chatbot		
Associated Knowledge Module: KM-			

ID	Name	Level	Credits
251201005-PM-11	Develop Software using Python	5	12
The focus of the learning in this module is on providing the learner with an opportunity to write code that logically solves a given problem. Learners will learn how to write, debug, maintain and document code The learner will be required to:			
PM-11-PS01	Perform operations using data types and operators		
PM-11-PS02	Control flow with decisions and loops		
PM-11-PS03	Perform input and output operations using files or from the console		
PM-11-PS04	Document and structure well-written code		
PM-11-PS05	Perform troubleshooting and error handling to detect and fix errors in code		
PM-11-PS06	Perform operations using built-in modules and tools		
Associated Knowledge Module: KM-			

ID	Name	Level	Credits
251201005-PM-12	Apply the Development Cycle when Developing Software	5	16
The focus of the learning in this module is on providing the learner with an opportunity to apply development methodologies and the fundamental principles of software development, including fundamental mathematical and logical concepts that underpin computational and systems thinking, to plan, design, develop, test, secure, document and deploy a software system to meet organisational requirements The learner will be required to:			
PM-12-PS01	Collect and analyse information on the requirements for the solution		
PM-12-PS02	Conduct feasibility checks to define and document software needs		
PM-12-PS03	Apply core business modelling and analysis skills to information systems development, and core skills in data modelling, database concepts, and design, to model a solution that meets organisational requirements		
PM-12-PS04	Create software design documents		
PM-12-PS05	Design a wireframe of the proposed amendments or new solution		
PM-12-PS06	Build the entire solution or component by writing code using the chosen programming language		
PM-12-PS07	Test and debug the solution during the development process		
PM-12-PS08	Deploy the build solution and		
PM-12-PS09	Maintain the deployed solution		
Associated Knowledge Module: KM-09 Software Development Life Cycle, Programming Languages, Algorithms and Security			

ID	Name	Level	Credits
251201005-PM-13	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-13-PS01	Collaborate with team members to apply innovative and problem-solving strategies		
PM-13-PS02	Apply design thinking process to solve a problem creatively and innovatively		
Associated Knowledge Module: KM-12 Design Thinking Principles for Innovation			

ID	Name	Level	Credits
251201005-PM-14	Function Ethically and Effectively in a Team	4	4
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-14-PS01	Present information to an audience		
PM-14-PS02	Conduct basic research (gather and explore data and information) on 4IR skills and application opportunities in the workplace		
PM-14-PS03	Ensure compliance with the code of conduct and governance in the workplace		
PM-14-PS04	Collaborate with team members in the workplace		
PM-14-PS05	Attend and participate in meetings		
Associated Knowledge Module: KM-11 4IR and Future Skills			

WORK EXPERIENCE MODULES (65 CREDITS)

ID	Name	Level	Credits
251201005-WM-01	Technical Requirement Analysis and Refinement	5	15
The focus of the work experience is on providing the learner with an opportunity to: Interrogate the specification and problem, interpret it into code and articulate in writing 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 • Familiarise self with legislation in the workplace • 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 information and business intelligence, etc.) • Spend time in the various departments of the company, observe process flows and do modelling of the processes observed using suitable tools and showing the relationships and influences the respective departments have on each other • Understand management requirements and expectations from software development and software solutions • Understand business computer system and the support required from the software development team • Manage timesheets and apply self-management skills • Collaborate with team members throughout the work experience period to achieve common and individual goals		

ID	Name	Level	Credits
251201005-WM-01	**Technical Requirement Analysis and Refinement**	**5**	**15**
WM-01-WE02	Observe and assist a software engineer with gathering of information and analysis of the requirements and problems • Conduct an analysis of technical application requirements • Assist in the collection and documentation of user's requirements, development of user stories, and estimates • Conduct user research to identify either improvements to our existing services or where new services could be developed • Gather information from consumers about program functionality • Analyse user requirements • Analyse and identify requirements related to people, processes and technology • Identifying areas for modification in existing programs and subsequently developing these modifications • Convert requirements into design documents • The implementation of is assisted with • Conduct economic feasibility checks to ascertain that the project can be completed in the given budget • Conduct legal feasibility checks to ascertain that the project can be completed within regulatory compliances • Conduct operational feasibility checks to ascertain that the operations expected by the client can be created • Conduct technical feasibility checks to ascertain that the current computer system can support the software • Conduct scheduling feasibility checks to ascertain that the project can be completed within given schedule		
WM-01-WE03	Under supervision, gather information and analyse the requirements and problems by conducting the following tasks • Conduct an analysis of technical application requirements • Assist in the collection and documentation of user's requirements, development of user stories, and estimates • Conduct user research to identify either improvements to our existing services or where new services could be developed • Gather information from consumers about program functionality • Analyse user requirements • Analyse and identify requirements related to people, processes and technology • Identifying areas for modification in existing programs and subsequently developing these modifications • Convert requirements into design documents • The implementation of is assisted with • Conduct economic feasibility checks to ascertain that the project can be completed in the given budget • Conduct legal feasibility checks to ascertain that the project can be completed within regulatory compliances • Conduct operational feasibility checks to ascertain that the operations expected by the client can be created • Conduct technical feasibility checks to ascertain that the current computer system can support the software • Conduct scheduling feasibility checks to ascertain that the project can be completed within given schedule		

ID	Name	Level	Credits
251201005-WM-02	Modelling Processes	5	15

The focus of the work experience is on providing the learner with an opportunity to:

Build a logical flow using the framework and methodologies at their disposal to propose possible solutions to business challenges

The learner will be required to:

WM-02-WE01	Observe and assist a software engineer with the modelling process and building a logical flow • Model processes using software applications as specified by the organisation • Apply core business modelling and analysis skills to information software development to implement and maintain a software system that meets organisational requirements • Increase efficiency and service through construction, maintenance, and streamlining of our computing systems and programs • Enhance the efficiency and cost-effectiveness of software solutions by designing software programs that are customised to our organisation's needs • Technical specifications and plans are developed based on the analysis of the requirements and consumer feedback • Technical documentation is developed to guide future software development projects • Apply core business modelling and analysis skills to model a solution that meets organisational requirements • Design a wireframe of the proposed amendments, or new solution, and prepare for sign off by client • Create software design documents
WM-02-WE02	Under supervision, conduct the modelling process and building a logical flow by conducting the following tasks • Model processes using software applications as specified by the organisation • Apply core business modelling and analysis skills to information software development to implement and maintain a software system that meets organisational requirements • Increase efficiency and service through construction, maintenance, and streamlining of our computing systems and programs • Enhance the efficiency and cost-effectiveness of software solutions by designing software programs that are customised to our organisation's needs • Technical specifications and plans are developed based on the analysis of the requirements and consumer feedback • Technical documentation is developed to guide future software development projects • Apply core business modelling and analysis skills to model a solution that meets organisational requirements • Design a wireframe of the proposed amendments, or new solution, and prepare for sign off by client • Create software design documents

ID	Name	Level	Credits
251201005-WM-03	Programming for Software Solution Development	5	25

The focus of the work experience is on providing the learner with an opportunity to:

Programme effectively using a suitable programming language to develop and test new solutions and update existing solutions

The learner will be required to:

WM-03-WE01	Observe and assist a software engineer with the effective programming using organisational programming languages to develop and test new solutions and update existing solutions • Apply design principles and core skills to design and develop an accessible and responsive information systems prototype, and test for usability, accessibility and user experience • Apply development methodologies and the fundamental principles of software development, including fundamental mathematical and logical concepts that underpin computational and systems thinking, to plan, design, develop, test, secure, document and deploy a software solution that meets organisational requirement and including associated change management during the build process and deployment • Apply the fundamentals of software development concepts and practice, including business concepts, development life cycles, data modelling, to support and enhance organisational processes and systems • Apply basic algorithmic techniques such as greedy algorithms, binary search, sorting and dynamic programming for solving various computational challenges and implement algorithmic coding problems in a programming language of the organisation • Design tests to check the correctness and running time, and debug software solutions • Apply various data structures such as stack, queue, hash table, priority queue, binary search tree, graph and string to solve programming challenges • Apply graph and string algorithms to solve real-world challenges: finding shortest paths on huge maps and assembling genomes from millions of pieces • Establish testing requirements in software development according to organisational guidelines and frameworks related to testing and design, implement and execute a test procedure and a script using a unit test framework and an integrated development environment (IDE) and create a test progress report to log and record test results • Use version control systems to build files, create the required directory and track content and versions as well as maintain a code repository of work in a software development environments • Apply secure coding practice for developing computer software that guard against the accidental introduction of security vulnerabilities • Generate reports, manuals and other documentation on the status, operation and maintenance of software • Identify organisational requirements to comply with IP, ethics and privacy policy procedures and comply with the protection and lawful use of intellectual property (IP) and to implement relevant organisational ethics and privacy policies and identify areas of potential risk and non-compliance to contribute to non-compliance incident identification and recommendations • Apply critical analysis and decision-making techniques to solve IT problems and provide relevant and timely outcomes • Apply professional, legal, and ethical principles and practices in a socially responsible manner as IT professional • Apply communication, collaboration, teamwork, documentation and customer service skills to enhance effectiveness in an IT role
WM-03-WE02	Under supervision, conduct the effective programming using organisational programming languages to develop and test new solutions and update existing solutions

ID	Name	Level	Credits
251201005-WM-03	Programming for Software Solution Development	5	25
	• Apply design principles and core skills to design and develop an accessible and responsive information systems prototype, and test for usability, accessibility and user experience • Apply development methodologies and the fundamental principles of software development, including fundamental mathematical and logical concepts that underpin computational and systems thinking, to plan, design, develop, test, secure, document and deploy a software solution that meets organisational requirement and including associated change management during the build process and deployment • Apply the fundamentals of software development concepts and practice, including business concepts, development life cycles, data modelling, to support and enhance organisational processes and systems • Apply basic algorithmic techniques such as greedy algorithms, binary search, sorting and dynamic programming for solving various computational challenges and implement algorithmic coding problems in a programming language of the organisation • Design tests to check the correctness and running time, and debug software solutions • Apply various data structures such as stack, queue, hash table, priority queue, binary search tree, graph and string to solve programming challenges • Apply graph and string algorithms to solve real-world challenges: finding shortest paths on huge maps and assembling genomes from millions of pieces • Establish testing requirements in software development according to organisational guidelines and frameworks related to testing and design, implement and execute a test procedure and a script using a unit test framework and an integrated development environment (IDE) and create a test progress report to log and record test results • Use version control systems to build files, create the required directory and track content and versions as well as maintain a code repository of work in a software development environments • Apply secure coding practice for developing computer software that guard against the accidental introduction of security vulnerabilities • Generate reports, manuals and other documentation on the status, operation and maintenance of software • Identify organisational requirements to comply with IP, ethics and privacy policy procedures and comply with the protection and lawful use of intellectual property (IP) and to implement relevant organisational ethics and privacy policies and identify areas of potential risk and non-compliance to contribute to non-compliance incident identification and recommendations • Apply critical analysis and decision-making techniques to solve IT problems and provide relevant and timely outcomes • Apply professional, legal, and ethical principles and practices in a socially responsible manner as an emerging IT professional • Apply communication, collaboration, teamwork, documentation and customer service skills to enhance effectiveness in an IT role		

ID	Name	Level	Credits
251201005-WM-04	Capstone project	5	10
The focus of the work experience is on providing the learner with an opportunity to: Alert the publisher to plagiarism, copyright or defamation issues and obtain permissions The learner will be required to:			
WM-04-WE01	Develop a solution that enhances the efficiency and cost-effectiveness of systems, resolve errors, and design programs that are customized to the organisation's needs through: Interrogating the specification and problem and interpret it into code and articulate in writing Building a logical flow using the framework and methodologies at their disposal to propose possible solutions to business challenges Programme effectively using a suitable programming language to develop and test new solutions and update existing solutions • Apply core project planning and management skills, including knowledge of project life cycles, to contribute to managing resources and producing relevant technical documentation for an information technology (IT) related project • Apply core business modelling and analysis skills to information systems development, and core skills in data modelling, database concepts, database management and design, to implement and administer a database management system that meets organisational requirements • Apply the fundamentals of information systems concepts and practice, including business concepts, development life cycles, data modelling and administration, to support and enhance organisational processes and systems • Apply critical analysis and decision-making techniques to solve IT problems and provide relevant and timely outcomes • Apply design principles and core skills in human computer interaction (HCI) to design and develop an accessible and responsive information systems prototype, and test for usability, accessibility and user experience • Apply development methodologies and the fundamental principles of software development, including fundamental mathematical and logical concepts that underpin computational and systems thinking, to plan, design, develop, test, quality assure, secure, document and deploy a software system to meet organisational requirements • Learning must include software/systems engineering, architecture, object-oriented modelling concepts and skills, and associated change management during the build process and deployment • Apply the fundamental principles of software development, including fundamental mathematical and logical concepts that underpin computational and systems thinking, to plan, create, test and document simple working code • Apply professional, legal, and ethical principles and practices in a socially responsible manner as an emerging IT professional • Apply communication, collaboration, teamwork, documentation and customer service skills to enhance effectiveness in an IT role		