Software Developer

Course Information

2024 - 2025

Occupational Qualification: Software Developer

Qualification Information

Level	SAQA ID	Credits
NQF 5	118707	220

Entry Requirements:

- NQF Level 4

Occupational Purpose

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

Occupational Tasks:

- Interrogate the specification and problem and interpret it into code and articulate in writing (NQF Level 5)
- Build a logical flow using the framework and methodologies at their disposal to propose possible solutions to business challenges (NQF Level 5)
- Programme effectively using a suitable programming language to develop and test new solutions and update existing solutions (NQF Level 5)

Assessments

- Formative assessment activities during the course of each module.
- Summative assessments at the end of each module
- An External Integrated Summative Assessment (EISA) at the end of the qualification.

NB: Access to the EISA is dependent on the successful of all qualification deliverables and formative and summative assessment at IQ.

Knowledge, Practical and Workplace Modules comprise the following competencies.

Knowledge Experience Module	Level	Credits
Computers and Computing Systems	4	12
Desktop and Professional Software to Communicate and Visualise Information	4	8
Automated Web Scraping as a Data Source	5	8
Logical Thinking and Basic Calculations	4	2
Computing Theory	4	2
Software Development with HTML5, Opensource Frameworks and Libraries	5	16
UML as Standard Modelling Language for Software and Systems Development	5	4
Obtaining, Querying, Manipulating and Presenting Data with and without MVC	5	6
Software Development Life Cycle, Programming Languages, Algorithms and Security	5	3
Introduction to Governance, Legislation and Ethics	4	2
4IR and Future Skills	4	2

Design Thinking Principles for Innovation	4	1

Practical Module	Level	Credits
Use Software to Communicate and Visualise Information	4	3
Use and Manage Spreadsheets and Workbooks	4	3
Use Desktop Applications to Analyse, Visualise and Report on Data	5	3
Use a Visual Analytics Platform and Visualisation Tools to Analyse, Visualise and report on Data	5	3
Query and Massage Data	5	3
Apply Logical Thinking and Maths	4	3
Apply Code to use a Software Toolkit/Platform in the Field of Study or Employment	5	3
Develop Software using HTML5, Opensource Frameworks and Libraries	5	16
Design and Build Web Applications, Desktop Graphical User Interfaces or Mobile Apps,	5	8
Use a Cloud Automation Platform to Create Solutions	4	8
Develop Software using Python	5	12
Apply the Development Cycle when Developing Software	5	16
Participate in a Design Thinking for Innovation Workshop	4	4
Function Ethically and Effectively in a Team	4	4

Workplace Modules	Level	Credits
Technical Requirement Analysis and Refinement	5	15
Modelling Processes	5	15
Programming for Software Solution Development	5	25
Capstone project	5	10

Knowledge Module 01

Knowledge Modules Breakdown

Problem solving skills for IT Professionals	4	5%
Techniques for safety	4	5%
System components	4	5%
Motherboards	4	5%
Processors	4	5%
Memory	4	5%
BIOS and CMOS	4	5%
Hard drives and storage devices	4	5%
Power supplies and voltage	4	5%
Ports, cables, and connectors	4	5%
Networking and network operating systems	4	5%
Networking and wireless connections	4	5%
Input and output devices	4	5%
Installing and managing printers	4	5%
Mobile devices, multimedia, and laptop computers	4	5%
Preventative maintenance	4	5%
Troubleshooting procedures	4	5%
Operating systems	4	5%
Managing files	4	5%
Applications utility, troubleshooting, and optimization	4	5%

Knowledge Modules Breakdown

Configuring device drivers	4	5%
Recovery	4	5%
Cloud computing	4	5%
Security fundamentals	4	5%
Programming and development	4	5%

Knowledge Module 02

Electronic Communication	4	15%
Software Apps for office use	4	15%
Operating a software package	4	15%
Text documents using an appropriate software package	4	40%
Presentations using and appropriate software package	4	15%

Knowledge Module 03

Sources of data	4	10%
Webscraping and access to accurate data	4	10%
Big Data	4	10%
Data quality	4	10%
Best practices for data governance	4	10%
Legislation (e.g. POPI Act)	4	25%
Wrangling	4	15%
Data structures	4	10%

Knowledge Modules Breakdown

Knowledge Module 04

Mathematical thinking skills for problem solving	4	15%
Conversion between decimal and binary systems	4	5%
Expressing size and magnitude	4	5%
Error in calculations	4	10%
Cartesian coordinate system	4	10%
Pythagorean theorem for finding the distance between two points	4	5%
Operator precedence	4	10%
Integer division	4	10%
Modulus	4	10%
Increments	4	10%
Mixing types	4	10%

Knowledge Module 05

Introduction to programming languages	4	30%
Programming basics	4	40%
Software applications	4	30%

Knowledge Modules Breakdown

Knowledge Module 06

Core programming	4	10%
Object-Oriented Programming	4	10%
General Software Development	4	15%
Web applications	4	10%
Applications development	4	10%
HTML5	4	15%
CSS	4	15%
JavaScript	4	15%

Knowledge Module 07

Introduction	4	5%
Modelling requirements	4	5%
Workflows: activity diagrams	4	10%
Classes and class diagrams	4	5%
Advanced class diagrams	4	5%
Object diagrams	4	5%
Sequence diagrams	4	10%
Communication diagrams	4	5%
Timing diagrams	4	15%

Knowledge Modules Breakdown

Interaction overview diagrams	4	5%
Classes internal structure: composite structures	4	5%
Component diagrams	4	10%
Packages	4	5%
State machine diagrams	4	5%
Deployed diagrams	4	5%

Knowledge Module 08

Understanding core database concepts	4	10%
Creating database	4	10%
Manipulating data	4	25%
Understanding Data	4	27%
Administering a database	4	28%

Knowledge Module 09

Introduction to software development	4	5%
Software Development Life Cycle	4	5%
The need for a solution	4	5%
Popular SDLC models	4	5%
Phase 1: Requirement collection and analysis	4	5%

Knowledge Modules Breakdown

Phase 2: Feasibility study	4	5%
Phase 3: Design	4	5%
Phase 4: Coding	4	5%
Phase 5: Testing	4	5%
Phase 6: Installation/Deployment	4	5%
Phase 7: Maintenance	4	5%
Software development logging and commenting	4	5%
Programming and programming languages	4	10%
Coding	4	5%
Overview of algorithms in information technology	4	5%
Algorithms	4	5%
Programming language concepts and terminology	4	5%
Security topics every software developer must know	4	5%
Machine learning	4	5%

Knowledge Module 10

Governance	4	20%
Legislation governing workplaces	4	15%
Introduction to ethics and security	4	5%
Ethics at work	4	14%
Security	4	15%

Knowledge Modules Breakdown

Performance management	4	10%
Business planning	4	7%
Costing of products	4	7%
Resources	4	7%

Knowledge Module 11

4 IR emerging trends	4	10%
Computing Knowledge	4	7%
Future skills and competencies (4IR)	4	10%
4 IR trends affecting businesses	4	10%
Interpersonal skills	4	5%
Intrapersonal skills	4	5%
Communication principles and methods	4	5%
Written business communication	4	7%
Presentation skills	4	7%
Team work in the workplace	4	10%
Committees and meetings	4	5%
Job descriptions and profiles	4	5%
Customers and stakeholders	4	7%
Customer service	4	7%

Knowledge Module 12

Knowledge Modules Breakdown

Introduction to design thinking	4	15%
The human element	4	10%
Creativity	4	20%
Innovation	4	20%
Design	4	10%
Design thinking methodology	4	10%
Application of design thinking	4	15%

Practical Module 01

Practical Modules Breakdown

Use electronic communication	4	Credits 3
Use software packages for office use	4	
Operate a software package	4	
Use software functions to create and manage documents	4	
Design and construct presentations	4	

Practical Module 02

Use workbooks	4	Credits 3
Manipulate data	4	
Create and work with tables	4	

Practical Modules Breakdown

Use references and formulas	4	Credits 3
Apply functionalities for using macros, referencing, language, collaboration and formatting	4	
Use formulas in a spreadsheet	4	
Visualise data using charts	4	

Practical Module 03

Report data using spreadsheets	5	Credits 3
Summarise and format data using spreadsheet tables	5	
Create, use and edit pivot tables and pivot charts	5	
Create, use and edit dashboards	5	
Create and configure hierarchies and time data	5	
Apply a spreadsheet data model	5	
Import data from files	5	
Import data from databases	5	
Import data from reports	5	
Visualize data	5	
Scrape data from the web using an appropriate too	5	

Practical Module 04

Use spreadsheet data with BI technologies	5	Credits 3
Self-service BI technology solutions	5	
Shape and combine data	5	

Practical Modules Breakdown

Model data	5	Credits 3
Use interactive data visualizations to represent data graphically	5	
Access data	5	
Use visualisation tools to present data as meaningful insights	5	

Practical Module 05

Write queries	5	Credits 3
Write SELECT queries	5	
Query multiple tables	5	
Sort and filter data	5	
Use SQL server data types	5	
Use data manipulation language (DML) to modify data	5	
Use built-in functions	5	
Group and aggregate data	5	
Use subqueries	5	
Use table expressions	5	
Use set operators	5	
Use ranking, offset, and aggregate functions	5	
Write queries using pivoting and grouping sets	5	

Practical Modules Breakdown

Execute stored procedures	5
Program with SQL	5
Implement error handling	5
Implement transactions	5

Practical Module 06

Number bases and measurement units	4	Credits 3
Basic math	4	
Operator precedence	4	
Integer division	4	
Functions, limits and continuity	4	
Differential calculus of single variable functions	4	
Modulus	4	
Increments	4	
Mixing types	4	
Casting (timing and contextualising)	4	

Practical Modules Breakdown

Practical Module 07

Source and compare at least three software toolkits/platforms/ languages used in your field of studies	5	Credits 3
Identify and contrast four (4) paradigms	5	
Create a programming environment (tailored to a specific tool or platform)	5	
Write code using a programming language for giving instructions for use of a software toolkit/platform	5	
Select and use correct data types (tailored to a specific tool or platform)	5	
Use complex types to organise data (tailored to a specific tool or platform)	5	
Add API's (Application Programming Interface) to an application (tailored to a specific tool or platform)	5	
Define a function (tailored to a specific tool or platform)	4	
Use logical branch statements and comparison operators (tailored to a specific tool or platform)	4	
Code loops (tailored to a specific tool or platform)	4	
Use and apply variable scopes (tailored to a specific tool or platform)	4	
Create queries to pull desired data using a structured query language (SQL) (applicable to data base) (tailored to a specific tool or platform)	4	
Handle errors and troubleshooting (tailored to a specific tool or platform)	4	
Identify the general steps for writing code (tailored to a specific tool or platform)	4	
Execute practical exercises 1, 2 and 3 using the specified product set	4	

Practical Modules Breakdown

Practical Module 08

Creating and Styling HTML5 Pages	5	Credits 16
Display data and handle events by using JavaScript	5	
Create forms to collect and validate user input	5	
Communicate with a remote data source	5	
Style text and block elements	5	
Refine code for maintainability and extensibility	5	
Create interactive pages by using HTML5 APIs	5	
Add offline support to web applications	5	
Implementing an adaptive user interface	5	
Creating advanced graphics	5	
Animate the user interface	5	
Implementing real-time communication by using web sockets	5	
Create a web worker process	5	
Package JavaScript for production deployment	5	

Practical Modules Breakdown

Practical Module 09

Plan a project to build a solution which effectively solve the customer's business problems (project design phase)	5	Credits 8
Configure middlewares and services	5	
Develop controllers for processing web requests	5	
Develop views to define the user interface for web applications	5	
Create code to develop MVC models to interact and model various types of data or objects	5	
Connect an application to a database to access and store data using an object□database mapper to build a database-driven website in MVC	5	
Build web applications apply a consistent look and feel to the application	5	
Develop the client-side of a web application using applicable tools	5	
Test and troubleshoot for bugs that results in exceptions or unexpected behaviour	5	
Manage security aspects of a web application	5	
Increase the speed of data access and communication to improve performance	5	
Implement web APIs to enable and promote application interaction with external systems	5	
Host and deploy an web application ensuring it is accessible by clients on a wide variety of machines	5	

Practical Modules Breakdown

Practical Module 10

Leverage business intelligence technology to create business solutions	5	Credits 8
Model data using a cloud automation platform functionality	5	
Apply the capabilities of Power Apps to build various Apps	5	
Build an automated solution using Power Automate	5	
Report and visually present data using a cloud automation platform	5	
Build a chatbot	5	

Practical Module 11

Perform operations using data types and operators	5	Credits 12
Control flow with decisions and loops	5	
Perform input and output operations using files or from the console	5	
Document and structure well-written code	5	
Perform troubleshooting and error handling to detect and fix errors in code	5	
Perform operations using built-in modules and tools	5	

Practical Modules Breakdown

Practical Module 12

Collect and analyse information on the requirements for the solution	5	Credits 16
Conduct feasibility checks to define and document software needs	5	
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	5	
Create software design documents	5	
Design a wireframe of the proposed amendments or new solution	5	
Build the entire solution or component by writing code using the chosen programming language	5	
Test and debug the solution during the development process	5	
Deploy the build solution and	5	
Maintain the deployed solution	5	

Practical Module 13

Collaborate with team members to apply innovative and problem-solving strategies	5	Credits 16
Apply design thinking process to solve a problem creatively and innovatively	5	

Practical Module 14

Present information to an audience	5	Credits 16
Conduct basic research (gather and explore data and information) on 4IR skills and application opportunities in the workplace	5	
Ensure compliance with the code of conduct and governance in the workplace	5	
Collaborate with team members in the workplace	5	
Attend and participate in meetings	5	

Workplace Modules Breakdown

Workplace Modules

Attend induction program and familiarise self with company processes, procedures, tools and culture	5	Credits 15
Observe and assist a software engineer with gathering of information and analysis of the requirements and problems	5	
Under supervision, gather information and analyse the requirements and problems by conducting the following tasks	5	

Workplace Modules

Observe and assist a software engineer with the modelling process and building a logical flow	5	Credits 15
Under supervision, conduct the modelling process and building a logical flow by conducting the following tasks	5	

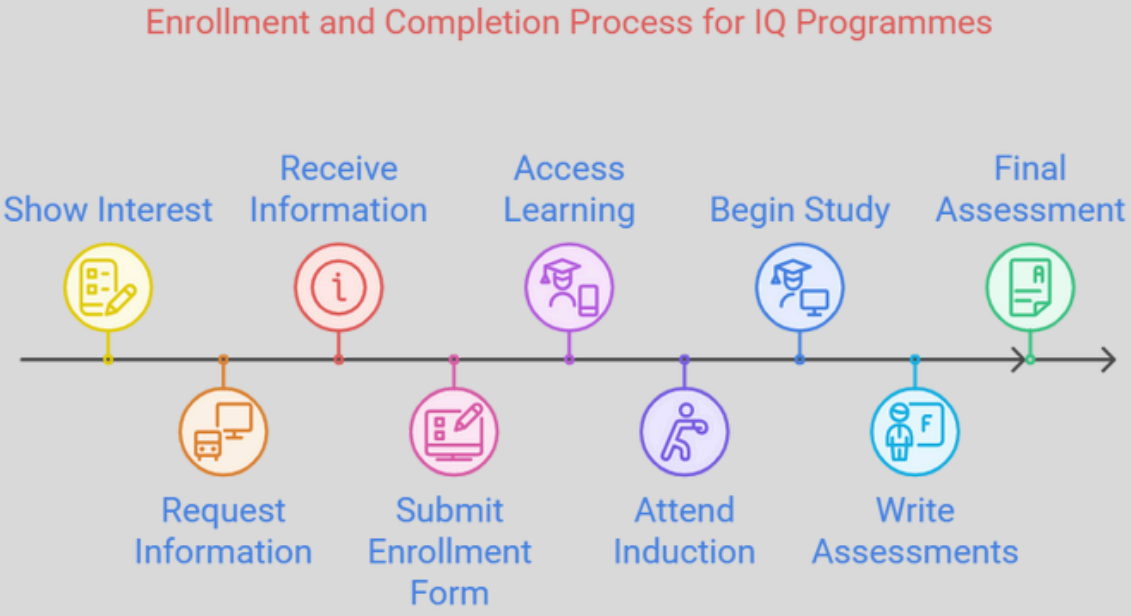
Workplace Modules

Observe and assist a software engineer with the effective programming using organisational programming languages to develop and test new solutions and update existing solutions	4	Credits 25
Under supervision, conduct the effective programming using organisational programming languages to develop and test new solutions and update existing solutions	4	

Workplace Modules

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	5	Credits 10
Interrogating the specification and problem and interpret it into code and articulate in writing	5	
Building a logical flow using the framework and methodologies at their disposal to propose possible solutions to business challenges	5	
Programme effectively using a suitable programming language to develop and test new solutions and update existing solutions	5	

Customer Journey



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