SYSTEMS
DEVELOPMENT

Course Guide

DESCRIPTION:

This qualification prepares learners for entry into the workplace or as undergraduate. study in the Systems Development areas covered at NQF level 5, providing them with the skills needed for further study in the fields of Information Technology and Computer Sciences at Higher Education level. Here we deal with programming languages like SQL, Java and C++.Upon successful completion of the qualification, the qualifying learner will have a thorough understanding of the role of an IT Systems Support person. He/she will be a well-rounded IT professional especially in the core field of networking and support, with further specialisation into IT Support or in any other related vertical or enabled markets.

Certificate in Project Management Level 5

Qualification details:

Programme ID: 48872
Number of credits: 131

NQF Level: 05
Duration: 12 Months

The qualification covers following disciplines:

- Procedural Programming
- Object Oriented Programming
- Fourth Generation Language Programming
- Web site development
- Multimedia
- Electronic Commerce

The programme covers the following modules:

1.   Business Application Development & Systems Analysis [115365;115392;114050]

During the course of your studies in systems analysis and design, you will acquire the foundational knowledge of the process of developing information systems with regard to

planning, analysis, design, system implementation and systems operation, support and security. You will also learn how information technology supports operational and business requirements, and gain insight into major cross-functional tool kits used by systems analysts in the IT environment.

The qualifying learner will be capable of:

- Design computer input and output functions
- Explain the principles of computer input and output design
- Create computer input and output functions
- Interpret a given specification to plan a computer program solution
- Design a computer program to meet a business requirement
- Create a computer program that implements the design
- Test a computer program against the business requirements
- Implement the program to meet business requirements
- Document the program according to industry standards
- Describe fundamental business concepts
- Describe systems theory with respect to information systems
- Explain how IT can be used in business
- Explain the relationship between a business and its data requirements

2. Database Management [114048; 114049]

This module provides you with the fundamental knowledge of designing simple databases by means of entity relationship diagrams and the implementation of these designs in a relational database management system. Effective databases are essential tools in the contemporary business environment, and the ability to store, modify, extract and search for information through databases is a valuable skill in this environment. During the course, you will also become familiar with the fundamentals of structured query language (SQL), learn how to design simple small-scale databases, including how to functionally apply SQL to implement and manipulate such databases.

After successful completing the course, you will be able to:

- Review requirements for database access for a computer application using SQL.
- Design database access for a computer application using SQL.
- Write program code for database access for a computer application using SQL.
- Test programs for a computer application that accesses a database using SQL.

- Document programs for a computer application that accesses a database using SQL.
- Describe data management issues and how it is addressed by a DBMS.
- Describe commonly implemented features of commercial computer DBMS`s
- Describe different type of DBMS`s
- Review DBMS end-user tools

3. Standard and Documentation Techniques [115388; 115362]

This module covers basic understanding is maintaining standards when dealing with creation of computer programmes. The learner will be trained on how to manage source files; these files should be provided to clients so they can print scalable versions of the design or edit them as they see fit.

After successful completing the course, you will be able to:

- Plan documentation for a computer program to agreed standards
- Create documentation for a computer program to agreed standards
- Review documentation for a computer program for completeness
- Locate software development source files
- Retrieve software development source files for update purposes

4. Research Techniques [115358; 115373; 114076]

This module is designed to assist the learner with the necessary tools when conducting research using computer technology. It also teaches the learner on data management.

After successful completing the course, you will be able to:

- Plan the research of a computer topic
- Conduct the research of a computer topic using computer technology, and to present the results of research of a computer topic using computer technology.
- Design and conduct an interview for gathering information for computer system development.

- Design and perform an analysis of the results from a questionnaire for gathering information for computer system development
- Gather data from documents for computer system development
- Observe a person's behaviour for gathering information for computer system development
- Consolidate the information gathered via different techniques.
- Demonstrate an understanding of how abstract data types are stored on computers• Demonstrate an understanding of sort techniques used to retrieve data held in data structures
- Demonstrate an understanding of search techniques used to retrieve data held in data structures

5. Testing and Troubleshooting [115359; 115367; 115384]

Basic troubleshooting and support is covered first; then students will learn the process of troubleshooting; troubleshooting techniques, and troubleshooting and software issues. This module provides the student with a broad view of PC Maintenance, focusing on the essential elements of hardware and software, as well as the importance of safety. It also explains the essential characteristics of a PC support technician and the various types of employment available.

After successful completing the course, you will be able to:

- Explain different errors found in the computer programming environment , and differentiate it from mistakes.
- Demonstrate how calculation errors are induced in the computer.
- Demonstrate how computer errors can be minimised.
- Describe different approaches to problem solving
- Use logical operations in descriptions of rules and relationships in problem situations
- Simplify Boolean expressions with Boolean Algebra and Karnaugh maps
- Describe the basic concepts of error detection
- Test a computer program against given specifications according to test plans
- Record the results from testing a computer program
- Review the testing process for a computer program against organisation policy and procedures.

6.   Business Environment for IT [116389; 115431;114051;114055;114059;13925]

The module will help candidates in the understanding of basic information pertaining to Information Technology/ Systems. The programme will also cover ethics, laws and regulations in the IT industry.

After successful completing the course, you will be able to:

- Demonstrate the ability to interpret given cost/benefit analysis documentation
- Prepare a time estimate for an element of work
- Describe professionalism for the computer industry in South Africa
- Describe the codes of practice for professionalism in the IT industry in South Africa
- Describe the code of ethics in the computer industry in South Africa
- Prepare for a technical practitioners meeting
- Chair a technical practitioners meeting

7.   Creating and Manage Web-based applications(Multimedia) [116368; 115371; 115370; 115375]

Whenever someone invents a new kind of digital display, multimedia designers have to think about how the public engage with it. Designers working in the field of multimedia design use imagery, typography, video, sound and computer-based interactive elements to communicate design messages. Design projects could include the creation of animated logos and identities for television broadcast, the animation of titles for movies, the interface for a new smart phone game or app, or the way a website looks and delivers its information. The field includes basic animation, computer graphics, storyboarding and interfaces for web design and mobile applications as well as design for interactivity. Multimedia designers are innovative, tech savvy and independently minded. Areas of employment include interactive design consultancies, advertising agencies, marketing and promotion companies, television, film and electronic media houses.

After successful completing the course, you will be able to:

- Design Layout
- Logos

- Branding
- Publications
- Web design

8. E-commerce Website and Apps [115383;115385;115380; 115377]

You will learn how to sell normal products like a t-shirt, digital products for download like audio, video or any digital document. You will also learn how to sell variable products like different sizes or colours and finally linked products like a laptop with a laptop carry bag. You will also learn how to sell external/affiliate products. You will also learn all about e-Commerce best practices and payment gateways in South Africa and International. We will look at Coupon Management and Integration for marketing purposes.

Benefits of investing in e-Commerce:

- Ability to expand your business into global market is less expensive.
- The cost of marketing and product advertising is still much less than print and tv media.
- Easy to manage and update product prices and changes.
- Detailed reports of items in few minute.
- Time saving for both vendor and customer.
- E-commerce is useful in both small and big enterprise.
- Sent information about new product to your customer by using email auto responders

9. Programming using 4th Generation Language [115390;115360;115389]

Fourth-generation computer programming language. 4GLs are closer to human language than other high-level languages and are accessible to people without formal training as programmers. They allow multiple common operations to be performed with a single programmer-entered command. They are intended to be easier for users than machine languages (first-generation), assembly languages (second-generation), and older high-level languages (third generation).

Benefits of using these languages:

- These programming languages allow the efficient use of data by implementing the various database.
- They require less time, cost, and effort to develop different types of software applications.
- The program developed in these languages are highly portable as compared to the programs developed in the languages of other generation

The module will cover the following:

- SOL,
- CSS,
- Coldfusion

10. Procedural Programming [115386;115387;115382]

In computer science, imperative programming is what's known as a programming paradigm. This means that the programming language uses statements that change a program's state as each one the statements is executed in turn. Procedural programming is a type of imperative programming in which the program is built from one or more procedures.

The programme covers the following:

- C programming
- Python programming
- Ruby programming

11. Object Oriented Program Design [115363; 115378]

The OOP or Object-Oriented Programming is a paradigm which allows you to write a program by modeling real-world things in terms of class and object. It not only make to represent a real-world thing in the programming world easier but also allow you to manage the complexity of your program.

You will learn how to use these object-oriented programming concepts in code examples, discover how these concepts are used in real-world applications that require user input and understand the benefits of mastering these concepts in Java

You also will learn about the four pillars that hold together the object-oriented programming, which are:

- Abstraction
- Encapsulation
- Polymorphism
- Inheritance

12. Web Graphic Design & animation Techniques [115391; 115364; 115366]

Candidates will gain the foundational knowledge about 3D Design and Animation. The programme will equip candidates with the knowledge and practical skills concerning 3D animation principles, designing and modelling in a 3D environment with architectural visualisation and animation feature films in mind. They will also accumulate foundational knowledge about the pre-production process for animation story telling as far as lighting design, scene set-up and animation is concerned

The programme covers the following:

- Philosophy and History of Animation
- Foundations of Drawing
- 3D Computer Graphics
- 3D Animation
- Drawing
- Design in Context
- Presentation Skills
- Contextual Info Design
- Creative Thinking
- Statistical Methods

Below is the mapping of the unit standards covered in this Qualification: Total Credits = 131

Module	Unit standard SAQA ID	Unit standard description	Level	Credits	Unit standard Type
Business Applications Development & Systems Analysis	115365	Apply the principles of designing computer system inputs and outputs	5	7	Core
	115392	Apply principles of creating computer software by developing a complete programme to meet given business specifications	5	12	Core
	114050	Explain the principles of business and the role of information technology	5	4	Fundamental
Total Credits	23				
Database Management	114048	Create database access for a computer application using structured query language	5	9	Core
	114049	Demonstrate an understanding of Computer Database Management Systems	5	7	Core
Total Credits	16				
Standard & Documentation Techniques	115388	Produce documentation for a computer program to agreed standards	5	3	Core
	115362	Manage software development source files using appropriate tools	5	5	Core
Total Credits	8				
Research Techniques	115358	Apply information gathering techniques for computer system development	5	7	Core
	115373	Demonstrate an understanding of sort and search techniques used in computer programming	5	6	Core
	114076	Use computer technology to research a computer topic	4	3	Fundamental
Total Credits	16				
Object Oriented Programme Design	115363	Apply fundamental principles of Object Oriented Programming to solve a given problem	5	10	Elective
	115378	Demonstrate an understanding of advanced object-oriented programming	6	14	Elective
	115381	Apply the principles of creating a computer program using an OOP language in a GUI environment	6	12	Elective
Total Credits	36				
Web Graphic Design & Animation Techniques	115391	Demonstrate an understanding of the principles of the internet and the world-wideweb	4	3	Core
	115364	Create animation for a multimedia/webbased computer application	5	10	Elective

	115366	Create graphic elements for a multimedia/web-based computer application	5	10	Elective
	115361	Create digitised text for a multimedia/webbased computer application	6	8	Elective

Total Credits		31			
Testing & Troubleshooting	115359	Demonstrate an understanding of the handling of error in a computer programming environment	4	2	
	115367	Demonstrate logical problem solving and error detection techniques	5	8	
	115384	Test a computer program against a given specification	5	6	
Total Credits		16			
Business Environment for IT	116389	Write a technical report	4	4	
	115341	Analyse feedback contexts and apply constructive feedback techniques	5	3	
	114051	Conduct a technical practitioners meeting	5	4	
	114055	Demonstrate an awareness of ethics and professionalism for the computer industry in South Africa	5	3	
	114059	Demonstrate an understanding of estimating a unit of work and the implications of late delivery	5	5	
	13925	Present information in a public setting	5	5	
Total Credits		24			
Create & Manage Web-based Applications	116368	Apply advanced HTML and associated techniques to build a web site for business applications	5	12	
	115371	Create digitised sound for a multimedia/web-based computer application	5	10	
	115370	Create digitised still images for a multimedia/webbased computer application	5	10	
	115375	Create digitised video for a multimedia/web-based computer application	5	10	
Total Credits		42			
e-Commerce Websites and Apps	115383	Demonstrate an understanding of the principles of designing and building an e-Commerce web site	5	10	
	115385	Demonstrate an understanding of the principles of implementing and managing an e-Commerce web site	5	12	
	115380	Demonstrate an understanding of the various types of ecommerce applications	5	8	
	115377	Explain the IT components of an e-Commerce system	5	4	
Total Credits		34			
Programming using 4ᵗʰ Generation Language	115390	Create an application for a single-user personal computer using a fourth generation language	5	10	
	115360	Demonstrate fourth generation language computer programming skills	5	7	

	115389	Design a computer application for a single-user personal computer for programming with a 4GL	6	12	
Total Credits		**29**			
Procedural Programming	115386	Apply the principles of creating batch and interactive computer programs using a procedural programming language	5	10	Elective
	115387	Apply the principles of creating a computer program using a procedural programming language in a GUI environment	6	14	Elective
	115382	Apply the principles of creating computer programs containing advanced algorithms using a procedural programming language	6	12	Elective
Total Credits		**34**			