



Higher Certificate in Information Systems (Machine Learning)

SAQA ID 120688 NQF Level 5

🕒 Mode and duration

Contact

Full-Time (Campus)

- Minimum: 1 year
- Maximum: 3 years

Part-Time (Campus)

- Minimum: 2 years
- Maximum: 5 years

☰ Qualification description

Power the next industrial revolution. Machine Learning is a branch of Artificial Intelligence (AI) that focuses on the scientific study of algorithms and statistical models that computer systems use to effectively perform a specific task without using explicit instructions. By applying machine learning techniques, computer systems can learn from data, identify patterns and make decisions with minimal human intervention.

The Higher Certificate in Information Systems (Machine Learning) is a career-focused qualification that is intensive but also broad. It provides you with the fundamental and technical knowledge as well as the applicable skill set in Databases, Python Programming, Statistical Thinking in Python, Supervised Learning with scikit-learn, Unsupervised Learning in Python, Linear Classifiers in Python, and Deep Learning in Python. You will also cover topics such as Computer Literacy, Program Design, Mathematical Problem Solving and Reasoning. Throughout the qualification, you will complete technical projects and challenging problems that will make you well-prepared and empowered for the world of work.

Over and above this, you will develop essential skills for the world of work, especially for the IT industry, such as analysing and solving real problems, logical thinking, being innovative and adaptable, working in teams and communicating effectively.

📄 Qualification accreditation

- Accredited by the Higher Education Quality Committee (HEQC) of the Council on Higher Education (CHE)
- Registered with the South African Qualifications Authority (SAQA)

👍 Entry requirements

1. South African National Senior Certificate (NSC) with Bachelor's degree, Diploma or Higher Certificate endorsement.
2. Or a National Certificate (Vocational) level 4 issued by the Council of General and Further Education and Training with Bachelor's degree, Diploma or Higher Certificate endorsement.
3. Or a Certificate of evaluation on a minimum NQF level 4 for foreign qualification confirmed by SAQA.
4. Or a letter or certificate confirming an exemption from Universities South Africa (USAf) for any other school-leaving results.
5. Or completion of a Bachelor's degree, Diploma, Higher Certificate or equivalent.

📁 Possible career options

The career choices for you as a Higher Certificate in Information Systems (Machine Learning) graduate include junior positions in:

- Data Administration
- Database Administration
- Data Analytics
- Data Mining
- Data Science
- Machine Learning

This qualification is offered at the following campuses:

- Bedfordview
- Bloemfontein
- Claremont
- Durban
- East London
- Mbombela
- Nelson Mandela Bay
- Potchefstroom
- Pretoria
- Tyger Valley
- Vanderbijlpark



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Qualification structure

Year 1

- Cloud Foundations (AWS)
- Computer Literacy (Microsoft)
- Database Design Concepts
- Machine Learning with Python
- Mathematical Problem Solving and Reasoning
- Personal Skills Development
- Program Design
- Python for Data Science
- Python Programming
- Software Engineering
- Elective - Choose 1
 - Database Management (MySQL)
 - Database Management (SQL Server)



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Module Descriptors

Year 1

Cloud Foundations (AWS)

This module will provide students with a detailed overview of cloud concepts, AWS core services; and the pricing, security including the controls in the AWS environment and some of the products and features available with AWS to meet security objectives, architectural best practices for designing and operating reliable, secure, efficient and cost-effective systems in the cloud, and support for these core services.

Computer Literacy (Microsoft)

The module teaches students how to use Microsoft Office applications such as Word, Excel, PowerPoint, Access and Outlook. This is intended to strengthen students' computer application skills as students will use Microsoft Office and fundamental computer operations for documentation and data management throughout the qualification. These skills also assist students in the preparation of design documents, presentations, budgeting spreadsheets, and other administrative tasks.

Database Design Concepts

This module focuses on systems analysis, entity relationship diagrams, data normalisation and mapping a database's design to tables.

Database Management (MySQL)

Students will be introduced to core MySQL scripts used for creating a database and how to implement these. Students will use MySQL scripts to add tables to the database. These tables are created with certain constraints such as primary keys, foreign keys, etc.

Database Management (SQL Server)

The module starts with the fundamentals of database design concepts. These consist of creating a database, altering a database and creating tables, which have certain constraints, such as primary keys and foreign keys. The module then looks at how to practically populate and implement the functions of a database.

Machine Learning with Python

This module provides students with an essential toolkit allowing them to create and train their own machine learning models, and use them to analyse datasets, with the final aim of leaving students prepared to engage in the artificial intelligence and big data industries of the world today.

Mathematical Problem Solving and Reasoning

The aim of this module is to provide students with a strong foundation in essential mathematical concepts, techniques, and their applications, enabling them to effectively solve computational problems and enhance their problem-solving skills in computer science and related fields.

Personal Skills Development

Personal Skills Development implies professional and personal growth in knowledge and skills. Personal Skills Development embraces a range of practical and transferable skills that can be applied within higher education and in the workplace. By conducting case studies, role play and real-life activities, the student should be able to improve their own learning, be involved in team work and be more capable of solving problems. The rationale behind this module is to expose the student to softer skills that are critical in the workplace and in higher education. This module attempts to encapsulate a range of key and common skills and deliver this information in a dynamic learning environment.

Program Design

This module will introduce basic concepts of programming logic using control structures. More advanced topics, such as arrays, file handling and functions are covered later in the course. The knowledge that students will gain will initiate the students to master, at a basic level, the process to develop computer program algorithms using Python.

Python for Data Science

This module focuses on Python specifically for data science. You will master the basics of data analysis in Python and expand your skill set by learning scientific computing with NumPy. You will gain knowledge and skills about Python Basics, Python Lists, Functions and Packages and NumPy. Thus, you will learn about powerful ways to store and manipulate data as well as cool data science tools to start your own analyses.

Python Programming

This module is aimed at teaching the student how to create applications using the Python programming language. Students would gain an understanding of Python's interpreter. Variables and constants/literals are also discussed, and the differences between them.



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Software Engineering

Students are then given a practical introduction to UML for use as a tool in the system development process. More specifically, students will familiarise themselves with use cases and scenarios, identify different actors that play a role in a system, and learn to draw using case diagrams. The unit also explores the use of state, sequence, collaboration, activity and deployment diagrams.