Bachelor of Science Honours in Information Technology (Data Science)

SAQA ID 120723 NQF Level 8

Mode and duration

Contact
Full-Time (Online)
- Minimum: 1 years
- Maximum: 2 years

Classes are mainly offered on Saturdays and some consultations may run during the week.

Qualification description

Stay at the forefront of digital advancement with the Bachelor of Science Honours in Information Technology, specialising in Data Science, a broad and rigorous postgraduate qualification designed to equip students with the critical knowledge and skills required to excel in the field of data science and analytics.

The BSc Honours IT (Data Science) degree is intended to provide students with a well-rounded education that covers both specialised knowledge and practical hands-on experience in the methods, tools, and technologies used in data science. Programming, data manipulation, statistical analysis, machine learning, and data visualisation are some of the skills that are mastered by the students.

The qualification's notable achievements can be largely attributed to its unique instructional methodology, characterised by a blended approach that encompasses interactive lecture-based instruction, smaller class sizes, and the integration of technology. In addition, our institution boasts a faculty of exceptionally committed educators who possess esteemed professional accreditations. Moreover, our curriculum remains both pertinent and progressive, consistently staying ahead of emerging trends in the field. The primary emphasis lies in the practical implementation of concepts, encompassing project completion, workshop participation, and the cultivation of critical information technology proficiencies.

Upon successful completion of the BSc Honours IT (Data Science), graduates are well-prepared to contribute effectively to the rapidly evolving field of data science and analytics. They may also pursue advanced degrees, such as an MSc in Computing, for further specialisation and research opportunities.

Entry requirements

1. A recognised undergraduate degree or equivalent for the specific honours degree.
2. Or an equivalent foreign undergraduate qualification on NQF level 7 approved by SAQA.
3. And the specific undergraduate qualification should preferentially include, but not limited to, these modules or their equivalence:
   - Python for Data Science
   - Machine Learning Algorithms
   - Database Systems Design, Implementation, and Management
4. And a minimum of 60% average during the exit year of the applicable undergraduate qualification.
5. Relevancy in - line with the stream being applied for at the discretional approval of the faculty where applicable.
6. Submission of the module outlines of the completed subjects might be required.

Possible career options

Graduates of a BSc Honours IT (Data Science) programme are well-prepared for a variety of roles in the data science and analytics field, such as:
- Business Intelligence Analyst
- Data Scientist, Data Analyst, Big Data Engineer
- DevOps Engineer
- Entrepreneur/Startup Founder
- IT Consultant, Researcher/Academic
- Machine Learning Engineer
- Microservices Developer, Microservices Architect
- Quantitative Analyst, Predictive Analyst, Data Miner

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)

This qualification is offered at the following campuses:

- Midrand

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Qualification structure

Year 1

Students develop a high level of competence and specialised knowledge in the discipline of BSc Honours IT (Data Science).

- Big Data Analytics Techniques
- Communication in Data Science
- Data Mining and Data Administration
- Natural Language Processing with Python
- Research Methodologies in IT Research
- Research Project
- Service-oriented and Microservices Architectures
- Time Series Analysis and Forecasting

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⬡ Module Descriptors

Big Data Analytic Techniques

The aim of this module is to showcase proficiency in utilising diverse data analytics techniques through the programming language R, as well as applying data mining methods to detect patterns and correlations within datasets. Upon the successful culmination of the module, students will acquire the capacity to cultivate an in-depth understanding of business data analytics; employ packages, statements, and functions within the realm of R programming; execute exploratory data analysis through the utilisation of visualisation techniques; employ hypothesis testing methods and ANOVA to inform business determinations; apply the principles of data mining techniques; and also examine the Hadoop software and its application in the field of in-database analytics.

Communication in Data Science

Effective communication is essential for data scientists. This module covers data visualization techniques, storytelling with data, and reporting insights to both technical and non-technical audiences. Students will learn to create compelling visualizations and present their findings coherently, enhancing their ability to drive informed decision-making in organizations.

Data Mining and Data Administration

The aim of this module is to showcase an in-depth understanding and utilisation of databases within decision support systems while also acquiring knowledge in databases and data mining techniques, along with practical aspects of databases. This module aims to enhance your understanding of data mining techniques using Python, specifically focusing on the extraction, cleansing, and transportation of data in a format that is more conducive to decision-making and data administration. The acquisition of knowledge in the module on data administration and data mining enables students to make well-informed decisions pertaining to the data within a given system. This module aims to equip students with the skills necessary to discern and analyse trends and patterns within datasets, thereby facilitating informed decision-making.

Natural Language Processing with Python

This module provides a systematic examination of Natural Language Processing (NLP), with an emphasis on the utilisation of Python and NLTK. The initial phase involves providing an introduction to NLP, establishing the requisite framework, and encompassing fundamental methodologies for text processing. The module will encompass various topics in NLP, including feature engineering, language modelling, syntax and parsing, sentiment analysis, topic modelling, text summarization, and machine translation. The module additionally presents the notion of chatbots and concludes with a hands-on project in which students construct a Customer Support ChatBot. This module aims to provide a comprehensive analysis of advanced topics in NLP, ethical considerations associated with NLP, and anticipated future trends within the field.

Research Methodologies in IT Research

This module is designed to equip students with the essential research skills required in the field of Information Technology (IT). Students will learn about various research methodologies, including quantitative and qualitative approaches, experimental design, survey methods, and case studies. They will develop critical thinking and analytical skills necessary for designing, conducting, and evaluating IT research projects. This module will also cover ethical considerations in IT research.

Research Project

The research project module is the culmination of the BSc Honours IT (Data Science) programme. Students will have the opportunity to apply the knowledge and skills acquired throughout the programme to a substantial research project in the field of data science or information technology. They will work closely with faculty advisors to define a research question, conduct a literature review, gather and analyse data, and draw meaningful conclusions. The research project will allow students to demonstrate their ability to conduct independent research and make valuable contributions to the field. It is an excellent opportunity for students to showcase their expertise and build a portfolio of real-world projects.

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Service-oriented and Microservices Architectures

In today's IT landscape, service-oriented and microservices architectures have become central to the development of scalable and maintainable software systems. This module will provide an in-depth understanding of these architectural paradigms. Students will explore the principles of designing and implementing services, containerization, and orchestration. Practical aspects such as RESTful APIs, service discovery, and scaling microservices will also be covered. Students will gain hands-on experience in building and deploying microservices-based applications.

Time Series Analysis and Forecasting

This module provides a comprehensive overview of time series analysis and forecasting techniques with practical applications in mind using Model Studio in SAS Viya. It starts with an introduction to the field of time series and its objectives, followed by an exploration of simple time series models. Topics include stationary processes, ARMA and ARIMA models, spectral analysis, modelling and forecasting with ARMA processes, nonstationary and seasonal time series models, financial time series, multivariate time series, and state-space models. The module also delves into advanced topics such as transfer function models, intervention analysis, nonlinear models, long-memory models, and continuous-time processes. It includes practical exercises and introduces students to software tools for analysis and forecasting.