



# Bachelor of Science Honours in Information Technology (Software Engineering)

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 Software Engineering, a broad and rigorous postgraduate qualification designed to equip students with the critical knowledge and skills for careers in software development and engineering.

The BSc Honours IT (Software Engineering) programme integrates specialised knowledge and practical proficiency in the field of software development. Upon completion of their studies, graduates are well-prepared to assume a variety of positions within the information technology (IT) industry. They possess the necessary skills and knowledge to actively contribute to the creation of software solutions that foster innovation and propel technological progress.

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 (Software Engineering), graduates are well-prepared for careers in designing, creating, and maintaining software systems and applications. 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:
  - Programming in Java, C# or Python
  - Software Process, Architecture Design and Quality Assurance
  - 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 discretionary 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 (Software Engineering) programme are well-prepared for a variety of roles in the Software Engineering field, such as:

- Data Miner, Web Developer, Software Developer
- Embedded Software Engineer
- Entrepreneur/Startup Founder
- Game Developer, Mobile App Developer
- IT Consultant, Researcher/Academic
- Microservices Developer, Microservices Architect
- Software Engineer, DevOps Engineer

## 📄 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 (Software Engineering).

- Computer Graphics and Game Development
- Data Mining and Data Administration
- Embedded System Software Development
- Front-end and Backend Technologies and Frameworks
- Hybrid Mobile Application Development
- Research Methodologies in IT Research
- Research Project
- Service-oriented and Microservices Architectures



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## Module Descriptors

### **Computer Graphics and Game Development**

In this module, you will gain knowledge and skills in computer graphics hardware, software, use cases, various operations on objects and graphical software environments, as well as game development, logical reasoning, and software development. In this module, you will learn the fundamentals of computer graphics and obtain the required knowledge and skills for game development. In addition, you will learn about Miscellaneous Math, Raster Images, Ray Tracing, Linear Algebra, Transformation Matrices, Viewing, Graphics Pipeline, Signal Processing, Surface Shading, Texture Mapping, and Data Structures for Graphics. Lastly, you will gain knowledge and skills in HTML5 Game Development with Phaser.Js and Python Game.

### **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.

### **Embedded System Software Development**

Students will learn about hardware and software aspects of embedded systems software development in this module. This module teaches students how to design robust and efficient embedded systems using theoretical foundations, practical design tools, and current challenges. Students should be able to design, develop, and optimise embedded systems for various applications by module end. This module covers embedded systems software development from hardware and software perspectives. Software modelling, C programming, microprocessor architecture, safety, security, reliability, real-time kernels, task scheduling, performance analysis, device interfaces, and more are covered. Practical exercises and problems teach students to design, develop, and optimise embedded systems for various applications.

### **Front-end and Backend Technologies and Frameworks**

This module covers web development and HTML5, CSS, and JavaScript front-end technologies. After HTML tags, attributes, and structural elements, it covers CSS properties and web content styling. It covers web page content organisation, including lists, figures, sections, and menus. To create engaging and feature-rich web apps, learn tables, CSS layout, links, images, and audio and video. Module topics include JavaScript variables, functions, and DOM. Canvas graphics, JavaScript form processing, event handling, loops, and object-oriented programming are covered. The module shows Node.js' back-end I/O simplicity and efficiency. We cover CommonJS, ESM, callbacks, events, promises, and async/await. The focus for efficient and composable code is stream types and implementation. Practical use cases introduce structural, behavioural, and creational design patterns. The universal JavaScript for web applications module teaches students how to share code between the browser and server using modules and module bundlers like webpack. Students learn advanced scalability, architectural, messaging, and integration patterns to build production-grade Node.js apps. To confidently build modern, interactive, and scalable web apps, this module teaches front-end and back-end web development.

### **Hybrid Mobile Application Development**

This module is designed to provide students with the fundamental skills and knowledge necessary to develop mobile applications for both the Android and iOS platforms. It is a hands-on, tutorial-based approach designed to guide students through the entire app development process, from conception to publication. The most up-to-date tools and technologies, such as Android Studio, SDK, Xcode, iOS, and Swift, are utilised to keep students abreast of the rapidly evolving mobile development landscape. Students will be able to create functional and user-friendly apps for Android and iOS devices by the end of this module.

### **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.



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## Module Descriptors

### **Research Project**

The Research Project module is the pinnacle of the BSc Honours IT (Software Engineering) programme, offering students the opportunity to engage in in-depth research, innovation, and problem-solving within the field of software engineering. This module is designed to foster independent thinking, creativity, and a deep understanding of advanced software engineering concepts. It prepares them for careers in research and development, academia, and leadership roles in the IT industry.

### **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.