FACULTY OF SCIENCE

ACADEMY OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING

HIGHER CERTIFICATE IN INFORMATION TECHNOLOGY

HEAD OF DEPARTMENT: Prof. DT. van der Haar

MAGANGER: Mr. A. Maganlal

2026

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Course Objectives

The main objective of the course is to provide you with a wide-ranging, sound, academically based and industry oriented training course during which you'll be steeped in software design and development; exposed to a wide range of technologies that will shape the future of computer applications over the next few years; fully grounded in both the theoretical and practical aspects of IT.

And just for the record, you'll be in good company, (in more ways than one). Our track record is, to say the least, quite impressive, including delegates from companies such as Standard Bank, Spoornet, Siemens Nixdorf, First National Bank, Liberty Life, Eskom, SANDF, SAA and the SABC.

Entrance Requirements

The minimum entrance requirements are:

- A matric certificate or equivalent qualification.
- Practical experience in the IT industry.

Please note: Each candidate will be individually selected by the Academy.

Course Format

The course is offered part-time over 1 year, and consists of 10 modules:

- 8 lectured modules each running over two weeks, from 18:00 to 21:00 daily
- 2 project modules with weekly meetings

Sessions consist of lectures and practical classes presented online. To qualify for the certificate, all 10 modules must be completed successfully.

General Information

For assistance with applications please contact:
Ms. Njabulo Hlatshwayo 011 559 2967 njabuloh@uj.ac.za
Manager of the Higher Certificate:
Mr. Atish Maganlal 011 559 3687 amaganlal@uj.ac.za

Please note: The Higher Certificate in IT is an extracurricular course that does not affect your entrance to, or credit towards, any university course. Once your application is approved, you will be notified of the relevant lecture times and dates in advance.

Tuition Fees

Fees for 2026 are R4320 per module:

- All training fees, lecture notes and examination fees are included in the above-mentioned amounts.
- Students must buy their own textbooks ±R700.00 per module.
- Only a limited number of students will be accepted each year.
- Fees are reviewed annually.

Examination Procedures

Each module will be examined individually - either by way of a project or examination. Lectured modules will have the exam a week after the end of the module.

The Modules

Module 1: Introduction to Program Design and Programming

- An introduction to important concepts by way of an in-depth case study. The design of each stage of the problem will be discussed at length, and the necessary constructs will be introduced by way of pseudo code.
- An introduction to a wide variety of design problems.
- Thorough groundwork which will equip you with practical, hands-on experience in program development.

Even experienced programmers would benefit from the well-structured and well-disciplined approach to programming offered by this module.

Module 2: The use of Basic Data Structures

- An expansion of the programming concept as discussed in Module 1.
- Expansion on the case study introduced in the previous module will be used to illustrate concepts at an advanced level of design and implementation.
- Introduction to the concept of basic data structures, such as arrays and structures.
- Functional discussion and illustration of advanced structures, such as stacks and queues, by means of practical design-oriented problems.

Please note: Both module 1 and 2 will focus mainly on the design of sound, correct and safe programs – covering data structures and procedures constituting the building blocks of good programming. Although the medium of instruction will be Visual Basic, other programming languages could easily be learnt once these modules have been completed.

Module 3: Databases

- The selection, design and implementation of database systems.
- A strong focus on design.
- The entity-attribute relation (EAR) analysis.
- The object-oriented model.
- A detailed study of the client/server model for distributed processing.

Please note: Practical work conducted in Microsoft Access.

Module 4: Software Engineering

- A state-of-the-art-overview of software development in general.
- Discussions of the functional information flow approach, as well as the object-oriented approach to software generation.
- Stimulation of critical thinking regarding the software generation process.
- A review of concepts such as life-cycle models and various methodologies.

Please note: Module 4 forms foundation from which to launch several projects which will be completed in the course of Module 5 and Module 10.

Module 5: Project Design

The main focus of this module will be the launch of a comprehensive design project, the topic which will be chosen in consultation with the mentors of the modules from ACSSE. Your work will be evaluated by way of project documentation, presentation, and possibly a demonstration.
Please note: Module 5 is a prerequisite for Module 10. Attendance of regular progress meetings is compulsory.

Module 6: Operating Systems

- An overview of computer systems
- The main elements of processor design.
- A brief overview of new processor developments such, as parallel, super-scalar and RISC Processors.
- Discussion of the characteristics of primary, secondary, and cache memory.
- The role of operating systems in the creation of environments conducive to program execution.
- The role of an operating system in its capacity as manager of computer resources
- Introduction to concepts such as user interfaces, file systems, multitasking, scheduling, protection, paging and virtual memory.
- A brief overview of commercial operating systems.

Module 7: Information Security

- Introduces Information Security as a formal discipline with a solid theoretical foundation.
- Covers core security principles: Authentication, Authorization, Confidentiality, Integrity, and Non-repudiation.
- Explains how these principles underpin modern Information Security Architectures.
- Demonstrates how common security mechanisms implement these principles in practice.
- Emphasises a holistic, organisation-wide view of Information Security rather than reliance on single tools.
- Provides a structured framework for understanding, implementing, and managing Information Security effectively.

Module 8: Data Communication and Networks

- The principles underlying data communication across computer networks.
- The basic principles underlying WANs, LANs and the Internet.
- Introduction to the network world by way of the 7-layer OSI model.
- Network management aspects such as Information Security.
- The most important LAN architectures and protocols.
- Recent developments on the Internet.
- Specific reference to the TCP/IP protocol.

Module 9: Project Management

- Introduction to IT Project Management
- The IT Project Management Context and Processes
- IT Project Integration Management
- IT Project Scope Management
- IT Project Time Management
- IT Project Cost Management
- IT Project Quality Management
- IT Project Human Resource Management
- IT Project Communications Management
- IT Project Risk Management
- IT Project Procurement Management

Module 10: Project Implementation

In the course of this module, you will be required to implement a workable prototype of the design completed in Module 5. The software-developing environment will be Microsoft Access, and you will need to be proficient in Access. (Keep in mind that no training for Microsoft Access will be provided.) **Please note**: Compulsory project progress meetings will be held regularly.