

# NATIONAL DIPLOMA: INFORMATION TECHNOLOGY: TECHNICAL APPLICATIONS

Qualification code: NDIL12 - NQF Level 6

Campus where offered: Soshanguve South Campus (day classes offered during the week and on Saturdays)  
Last year of new intake: 2016  
Teach-out (phase-out) date: 31 December 2023

Students registered for this qualification should complete their studies according to the teach-out date prescribed for the qualification, subject to the stipulations of Regulation 3.1.11 and 3.1.13 in the Students' Rules and Regulations.

Information on phased-out programmes can be obtained from the TUT website, [www.tut.ac.za](http://www.tut.ac.za).

Key to asterisks:

\* Information does not correspond to information in Report 151.  
(Deviations approved by the Senex of 22 June 2011.)

## CURRICULUM

Consult the 2019 Faculty Prospectus for the full contents of the qualification.

### FIRST YEAR

Please note that students will register for all first-year subjects under qualification code NDIT12, where they will be introduced to the basic principles of computers and information technology skills.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
<b>FIRST SEMESTER</b>			
CFS10AT	Computing Fundamentals IA*	(0,125)	
CGS10AT	Computing Systems IA*	(0,125)	
CMK10AT	Computing Skills IA*	(0,125)	
DSO17AT	Development Software IA	(0,125)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
<b>SECOND SEMESTER</b>			
CFS10BT	Computing Fundamentals IB*	(0,125)	
CGS10BT	Computing Systems IB*	(0,125)	
CMK10BT	Computing Skills IB*	(0,125)	
DSO17BT	Development Software IB	(0,125)	Development Software IA
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		<b>1,000</b>	

### SECOND YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
<b>FIRST SEMESTER</b>			
DSO23AT	Development Software IIA	(0,125)	Development Software IB
ISY23AT	Information Systems IIA	(0,125)	Computing Fundamentals IB
SSF24AT	System Software IIA	(0,125)	Computing Systems IB
TPG101T	Technical Programming I	(0,250)	Development Software IB
TOTAL CREDITS FOR THE SEMESTER:		0,625	



## SECOND SEMESTER

DSO23BT	Development Software IIB	(0,125)	Development Software IIA
ISY23BT	Information Systems IIB	(0,125)	
SSF24BT	System Software IIB	(0,125)	Computing Systems IB
TPG21AT	Technical Programming IIA	(0,125)	Technical Programming I
TPG21BT	Technical Programming IIB	(0,125)	Technical Programming I
TOTAL CREDITS FOR THE SEMESTER:		0,625	
TOTAL CREDITS FOR THE SECOND YEAR:		<b>1,250</b>	

## THIRD YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
<b>FIRST SEMESTER</b>			
IDC30AT	Industry Exposure IIIA	(0,125)	
SSF30AT	System Software IIIA	(0,125)	System Software IIA System Software IIB
SSF30BT	System Software IIIB	(0,125)	System Software IIA System Software IIB
TPG30AT	Technical Programming IIIA	(0,125)	Technical Programming IIA Technical Programming IIB
TPG30BT	Technical Programming IIIB	(0,125)	Technical Programming IIA Technical Programming IIB
TOTAL CREDITS FOR THE SEMESTER:		0,625	

## SECOND SEMESTER

**On completion of all the above subjects. Students with only one subject outstanding may be allowed to register for that subject and Industry Exposure IIIB with the approval of the Head of Department.**

IDC30BD	Industry Exposure IIIB	(0,125)	
TOTAL CREDITS FOR THE SEMESTER:		0,125	
TOTAL CREDITS FOR THE THIRD YEAR:		<b>0,750</b>	
TOTAL CREDITS FOR THE QUALIFICATION:		<b>3,000</b>	

## SUBJECT INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular subject. At time of publication, the syllabus content was defined as follows:

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#### COMPUTING FUNDAMENTALS IA (CFS10AT)

**1 X 3-HOUR PAPER**

*(Subject custodian: End User Computing Unit)*

The student is introduced to the fundamentals of computers and information systems, computer organisation and data processing. (Total tuition time: ± 90 hours)

#### COMPUTING FUNDAMENTALS IB (CFS10BT)

**1 X 3-HOUR PAPER**

*(Subject custodian: End User Computing Unit)*

The basic concepts of system development, data management, management information systems, ethics, privacy and security, purchasing and maintaining microcomputers, number systems and binary logic. (Total tuition time: ± 54 hours)



**COMPUTING SKILLS IA (CMK10AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Informatics)**

This subject aims to equip the student with fundamentals of IT Soft skills for both the ICT industry and other working environments upon which a successful career can be built. In addition, it will also improve the student's relation and interaction abilities needed within the dynamic ICT industry. The student who successfully completes this subject must identify and implement various thinking skills and learning styles, state the legal and cultural sensitivity issues of IT, identify and explain the variety of soft skills including study skills and strategies, research, presentation as well as communication skills, and identify and explain interpersonal skills in relation to character, time management and team building dynamics and conflict resolution. (Total tuition time: ± 60 hours)

**COMPUTING SKILLS IB (CMK10BT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Informatics)**

The aim of this subject is to extend the skills in CMK10 AT so as to improve on student's relations and interaction capabilities that will be applicable within the dynamic ICT industry and the external environment. The student who successfully completes this subject must describe, distinguish and portray changes in terms of personality profiles, emotional intelligence, self-management, stress management and relationship management; identify and apply the notion of team dynamics; deal with conflict and understand the dynamics behind change; report on effective correspondence; produce meeting documents; conduct meetings; and demonstrate the required communication skills to develop interpersonal business relationships through by means of group work. (Total tuition time: ± 60 hours)

**COMPUTING SYSTEMS IA (CGS10AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Systems Engineering)**

Introduction to hardware, operating systems, motherboards, processors, memory, hard drives, installing and supporting I/O devices, multimedia devices and mass storage, PC maintenance and troubleshooting strategies, and installing and maintenance of Windows. (Total tuition time: ± 54 hours)

**COMPUTING SYSTEMS IB (CGS10BT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Information Technology)**

Provides the foundation of data communications and local area management, OSI model and/or TCP/IP protocol stack model, data transmission principles, media, major protocols, topologies, routing methods, introduction to networking principles and network operating system fundamentals. (Total tuition time: ± 54 hours)

**D****DEVELOPMENT SOFTWARE IA (DSO17AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim: To learn to solve problems using the basic programming principles, and then practically apply that knowledge in C++. Objectives: To enable the student to understand problems and know how to solve them by using a computer; understand the general concepts and arithmetic used in programming, sequence, selection and iteration control structures and a variety of built-in data types, including strings. The students are exposed to the concept of event-driven programming in a visual programming environment focusing on the development of graphical user interfaces to solve real-life practical programming problems. (Total tuition time: ± 72 hours)

**DEVELOPMENT SOFTWARE IB (DSO17BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim: To expand on the already mastered knowledge obtained in Development Software IA. Objectives: To broaden the programming skills base of the student by adding the following topics: write an algorithm and applying it in VB.NET/C++ using functions and sub-procedures, and write an algorithm containing one-dimensional arrays. String manipulation will be continued as well as a brief introduction to text file processing. (Total tuition time: ± 72 hours)

**DEVELOPMENT SOFTWARE IIA (DSO23AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

This subject introduces Oracle and SQL to students. The subject includes standard queries, joins, functions, sub-queries, report writing, creation of tables and views, data manipulation using the Oracle courseware and the Oracle software. Students also learn how to create and maintain database objects and how to store, retrieve and manipulate data. (Total tuition time: ± 59 hours)



**DEVELOPMENT SOFTWARE IIB (DSO23BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

This subject introduces students to PL/SQL programming blocks or program units in the Oracle environment. This subject includes the Development of efficient PL/SQL programs to access Oracle databases, creation of stored procedures and functions for maximum reuse and easy code maintenance using the Oracle courseware and the Oracle software. Students would need the knowledge of Oracle and SQL for this subject. (Total tuition time: ± 59 hours)

**I****INDUSTRY EXPOSURE IIIA (IDC30AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Informatics)**

This subject enables students to gain insight to organisational characteristics and behaviour, personal and technological entrepreneurship; other issues include ethical and professional conduct in the workplace. The subject will also increase their knowledge of individual behavioural aspects, namely biographical characteristics, values attitudes, job satisfaction and personality and emotions, perceptions and individual decision making; broaden their understanding of the administrative structures of organisations, bureaucratic behaviour in global and diverse context; and develop interpersonal skills in applying and integrating contemporary theories of motivation. (Tuition time: ± 60 hours)

**INDUSTRY EXPOSURE IIIB (IDC30BD)****CONTINUOUS ASSESSMENT****(Subject custodian: Department of Computer Science)**

Industry Exposure IIIB is career-orientated and is aimed at integrating academic training with practical skills, as demanded by industry. Students work in industry for six months. (No formal tuition)

**INFORMATION SYSTEMS IIA (ISY23AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Science)**

Understanding Systems Analysis fundamentals and the role of information technology in today's dynamic business environment; How to analyse a business case in the systems planning phase and the importance of understanding business operations and requirements and how IT projects support a company's overall strategic plan as well as the importance of conducting a preliminary investigation and a feasibility study; Learn about project management and how to plan, schedule, monitor and report on IT projects; Understand how to gather facts about a systems project, prepare documentation, and how to develop or create graphical models that show how the system transforms data into useful information and these models are used to design and develop systems. (Total tuition time: ± 72 hours)

**INFORMATION SYSTEMS IIB (ISY23BT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Science)**

The subject accommodates students from a broad spectrum of disciplines and interest. It includes a theoretical as well as a practical component. Theoretical component covers the systems design, systems implementation and systems support and security phases. Students choose different programming languages and integrate them to design commercial system. This subject provides the knowledge and practical skills needed to complete the development and design phases of a commercial system. (Total tuition time: ± 72 hours)

**S****SYSTEM SOFTWARE IIA (SSF24AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Systems Engineering)**

Students are introduced to the basic system administration knowledge of Red Hat Linux, as well as to network administration in the Linux environment. (Total tuition time: ± 78 hours)

**SYSTEM SOFTWARE IIB (SSF24BT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Information Technology)**

Network concepts defined in System Software I will be further explored. The emphasis is on the TCP/IP protocol suite and services, and building a TCP/IP network. LAN and WAN infrastructures, remote networking, network security and disaster recovery form an integral part of this subject. (Total tuition time: ± 78 hours)

**SYSTEM SOFTWARE IIIA (SSF30AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Systems Engineering)**

Exposure to the latest enterprise operations systems, including Microsoft technologies. (Total tuition time: not available)



**T****TECHNICAL PROGRAMMING I (TPG101T)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim: To introduce the student to object-orientated concepts and principles using the Java programming language. Objectives: The student must be able to set up and use the Java development environment, create programs that are in accordance with the Java naming conventions, use his or her own and pre-defined classes in programs, use structures such as control and iterative, use iterative statements in a program, manipulate strings and characters in a program, use arrays in a program, use inheritance, polymorphism and exception handling mechanisms, and understand graphical user interface design. Key topics: Java classes, methods, objects, decision making, loops, strings, primitive arrays, reference arrays, file manipulations, inheritance, polymorphism, exception handling, GUI components. (Total tuition time: ± 120 hours)

**TECHNICAL PROGRAMMING IIA (TPG21AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: The student is introduced to a modern C++ Rapid Application Development Tool for Win32 with the purpose of solving every day programming challenges. Objectives: Through the approach of problem solving the student will be confronted with industrial challenges to be solved inside the framework of the current GUI environment. More complex manipulations of standard Windows components form the basis of the subject, e.g. graphical images, multiple forms, grid structures, selection structures, menu systems, and dynamically created objects. The subject is completely OOP compliant and includes pre-manufactured as well as self-manufactured objects interacting. A medium sized C++ project ready to be sold is expected to be completed towards the end of the semester. Key topics: Advanced OOP, C++, dynamic object instantiation, event-driven programming, back-end classes, strategic solution planning, systematic programme design, flat file data handling. (Total tuition time: ± 72 hours)

**TECHNICAL PROGRAMMING IIB (TPG21BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: To introduce students to mobile device programming, by making use of J2ME. The students create small mobile applications that will run using the CLDP configuration and MIDP profile. Objectives: To create a mobile application that has different screens and events. To create custom items. To manage a record store. Key Topics: The mobile environment, graphical user interfaces for mobile, event-driven programming, record store management. (Total tuition time: ± 72 hours)

**TECHNICAL PROGRAMMING IIIA (TPG30AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: To introduce students to advance features of Mobile Device programming. The students create messaging applications such as Email, SMS and MMS. Objectives: To create a mobile application using some of the optional packages as well as MIDP2.1; To be able to read and write to a file using FileConnection; To be able to use HttpURLConnection to send and receive data over the internet. Key topics: Wireless Messaging API to send and receive a SMS and a MMS, Mobile messaging Applications – Email, PIM, access to backend Databases. (Total tuition time: ± 72 hours)

**TECHNICAL PROGRAMMING IIIB (TPG30BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: To introduce students to Web components using Java servlet/JSP technologies. To create a web application using Servlets and JSPs. Objectives: Understand Servlet and JSP life cycle, understand the Server setup (Tomcat). Handling client requests; Generating Server response; Handling Cookies; JSP tags and page directives. Key topics: Servlet API, JSP directives, Server setup, Redirect and Dispatcher, Cookies and JSP page directives. (Total tuition time: ± 72 hours)

