

# NATIONAL DIPLOMA: INFORMATION TECHNOLOGY: WEB AND APPLICATION DEVELOPMENT

Qualification code: NDIW12 - 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 NDIW12, 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>			
GUI10AT	Graphical User-Interface Design IA	(0,125)	
ISY23AT	Information Systems IIA	(0,125)	Computing Fundamentals IB
ITN20AT	Internet Programming IIA	(0,125)	Development Software IB
TPG12AT	Technical Programming IA	(0,125)	Development Software IB
WEB20AT	Web Management IIA	(0,125)	
TOTAL CREDITS FOR THE SEMESTER:		0,625	



## SECOND SEMESTER

GUI10BT	Graphical User-Interface Design IB	(0,125)	Graphical User-Interface Design IA
ISY23BT	Information Systems IIB	(0,125)	Information Systems IIA
ITN20BT	Internet Programming IIB	(0,125)	Internet Programming IIA
TPG12BT	Technical Programming IIB	(0,125)	Technical Programming IA
WEB20BT	Web Management IIB	(0,125)	Web Management IIA
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)
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### FIRST SEMESTER

IDC30AT	Industry Exposure IIIA	(0,125)	
ITN30AT	Internet Programming IIIA	(0,125)	Internet Programming IIB Technical Programming IA
ITN30BT	Internet Programming IIIB	(0,125)	Internet Programming IIB Technical Programming IA
WEB30AT	Web Management IIIA	(0,125)	Web Management IIB
WEB30BT	Web Management IIIB	(0,125)	Web Management 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 IIB with the approval of the Head of Department.**

IDC30BF	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:

### C

#### 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)

**G****GRAPHICAL USER-INTERFACE DESIGN IA (GUI10AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

This subject introduces and teaches students Web design concepts and techniques in a Web authoring course that covers HTML and Adobe Dreamweaver. The objective of this subject is to present a practical approach to Web design using a blend of traditional development with current technologies, giving students an in-depth understanding of Web design concepts and techniques that are essential to planning, creating, testing, publishing, and maintaining Web sites. Contents include introduction to the Web environment and its tools, Web publish fundamentals, successful planning of Web sites, typography and graphics, Multimedia and interactivity on the Web and promoting and maintaining of Web sites. (Total tuition time: ± 80 hours)



**GRAPHICAL USER-INTERFACE DESIGN IB (GUI10BT)**  
**(Subject custodian: Department of Computer Science)**

**1 X 4-HOUR COMPUTER-BASED**

This subject teaches the student the skills and knowledge to facilitate the alignment of IT and business processes using ICT Web solutions. The content offers creative projects, concise instructions, and a complete coverage of basic and advanced Macromedia Flash 8 skills, helping you to create and publish Flash animation. After completion of the subject, students will be able to analyse and design Web solutions to industry related Information Technology problems, utilise the required technical skills to effectively implement the designed solutions in a distributed IT environment. Demonstrate the effective utilisation of business and management skills to bridge the gap between the IT discipline and the business functional areas in industry. (Total tuition time: ± 80 hours)

I

**INDUSTRY EXPOSURE IIIA (IDC30AT)**  
**(Subject custodian: Department of Informatics)**

**1 X 3-HOUR PAPER**

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 (IDC30BF)**  
**(Subject custodian: Department of Computer Science)**

**CONTINUOUS ASSESSMENT**

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)**  
**(Subject custodian: Department of Computer Science)**

**1 X 3-HOUR PAPER**

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)**  
**(Subject custodian: Department of Computer Science)**

**1 X 3-HOUR PAPER**

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)

**INTERNET PROGRAMMING IIA (ITN20AT)**  
**(Subject custodian: Department of Computer Science)**

**1 X 4-HOUR COMPUTER-BASED**

This subject teaches students how to design and develop websites using client side technologies including XHTML, Cascading Style Sheets, and JavaScript. At the end of this subject, students should show the ability to develop interactive client side websites. Contents include: Basic XHTML, imaging for the web (image basics, raster and vector graphics, common image formats), advanced XHTML (meta elements, span and div elements, image maps, tables, forms, frames), cascading Style Sheets, JavaScript Introduction + Arithmetic, JavaScript Control Structures, JavaScript Functions, JavaScript Arrays, JavaScript Objects, DHTML + DHTML Events model (The on click, on load, on error, mouse and form events, event bubbling, etc.) (Total tuition time: ± 60 hours)



**INTERNET PROGRAMMING IIB (ITN20BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

This subject teaches students how to design and develop and deploy dynamic web applications using server-side technologies namely ASP.NET, c#, IIS /Tomcat server and Database. At the end of this subject, students should show the ability to develop dynamic and interactive 3-tier client-server-database web applications using c# in an ASP.NET development environment. Contents include reasons for using Server-Side Web scripting, Introduction to C#, Exception handling, object oriented programming in C# and the .NET framework; introduction to the Visual Studio IDE and the basic concepts of ASP.NET. (Total tuition time: ± 60 hours)

**INTERNET PROGRAMMING IIIA (ITN30AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

This subject teaches students how to design and develop and deploy advanced dynamic web applications using server-side technologies including PHP, IIS /Tomcat server and Database. At the end of this subject, students should show the ability to tie together various aspects previously studied in the National Diploma: Information Technology: Web and Application Development; and develop dynamic and interactive 3-tier client-server-database web applications. Contents include overview of: reasons for using PHP, MySQL and, Server-Side Web scripting, getting started with PHP, Adding PHP to HTML, syntax and variables, control and functions, passing information between pages, Strings, Arrays and Array Functions, Numbers. Advanced contents include: Object-Oriented Programming with PHP, advanced array functions, string and regular expression functions, file system and system functions, sessions, Cookies, and HTTP basics, types and type conversions, advanced use of functions, security, configuration, exceptions and error handling, debugging; choosing a Database for PHP; SQL Tutorial; MySQL Database administration; PHP/MySQL functions; displaying queries in tables; building forms from queries; PHP/MySQL efficiency; PostgreSQL; Oracle; PEAR Database functions; E-mail; PHP and JavaScript/Java/XML/Web services; graphics; Weblogs; user authentication. (Total tuition time: ± 60 hours)

**INTERNET PROGRAMMING IIIB (ITN30BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Students are introduced to the various database concepts, the design, implementation and management of a database system, as well as Standard Query Language and the practical application of SQL. The SQL principles will be applied practically in the use of the Oracle SQL courseware and software. The qualifying student should have a broad understanding of the environment within which the software component of a computer-based system is developed; to enable them, for example, to liaise between end users and system designers/programmers; to recommend particular software packages and to write and modify programmes. The student should be able to explain and apply database concepts and approaches to database design. The practical part includes programming with MySQL as a database management system (DBMS). (Total tuition time: ± 90 hours)

**T****TECHNICAL PROGRAMMING IA (TPG12AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: To introduce the student to object-orientated concepts using the Java programming language. Objectives: The student must be able to set up the Java development environment, use the applications coming along with the Java language to compile, bundle together, run and document programs create programs that are in accordance with the Java Naming Convention use pre-defined classes in programs create own classes, use decision statements in a program, use iterative statements in a program manipulate strings and characters in a program, use arrays in a program. Key topics: Java classes, methods, objects, decision making, loops, strings, primitive arrays, reference arrays. (Total tuition time: ± 78 hours)

**TECHNICAL PROGRAMMING IB (TPG12BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

Aim/Purpose: To introduce the student to advanced OOP principles, robust programming, files manipulation and advanced graphical user interfaces using the java programming language. Objectives: To introduce the students to advanced concepts of OOP such as inheritance, polymorphism. Exception handling mechanisms, introduction to basic graphic and advanced graphic user interface design. Key topics: File manipulations, inheritance, polymorphism, exception handling, GUI components. (Total tuition time: ± 80 hours)



**WEB MANAGEMENT IIA (WEB20AT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

**Aim/Purpose:** To introduce the students to the basics of server and web server management, Installation and configuration of web servers. The subject exposes students to Microsoft and Linux server environments, installing and testing web server programming environment, maintaining security, controlling access to network resources and monitoring network systems. Knowledge gained from this subject forms a foundation to an understanding of website hosting and development, which makes up the core of second- and third-level subjects. **Objectives:** On completing this subject, the student will be able to understand the difference between servers and web servers, distinguish between the roles of server administrators and web server administrators, distinguish between static and dynamic web servers, identify the importance of and distinguish between client and server side scripting languages. They should be able to install, configure, and host single or multiple websites using IP address, port number or based on host name. (Total tuition time: ± 90 hours)

**WEB MANAGEMENT IIB (WEB20BT)****1 X 4-HOUR COMPUTER-BASED****(Subject custodian: Department of Computer Science)**

**Aim/Purpose:** To teach students how to create interactive websites, from the simplest form through to complex, secure e-commerce sites using both open source and commercial technologies such as Dreamweaver, PHP and MySQL. The subject will take a student through the planning, design and building of web projects such as the following: User authentication and personalisation; Shopping carts, content management systems (CMS), web-based email, mailing list managers; web forums, pdf document generation, web services with XML and SOAP. **Objectives:** On completion of this subject, the student should be able to embed PHP in HTML and add dynamic content to a website, understand the web architecture and how file systems and MySQL database fits in, effectively use MySQL and PHP to create database users and assign permissions, create databases, tables and indexes, populate the database, query the database from the web interface. Specific contents include PHP crash course, storing and retrieving data using files, string manipulation and regular expressions, reusing code and writing functions, interacting with the server and file system, using network and protocol functions, designing and creating web databases, accessing MySQL databases from the Web with PHP. (Total tuition time: ± 90 hours)

**WEB MANAGEMENT IIIA (WEB30AT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Computer Science)**

**Aim/Purpose:** To teach students strategies for developing highly ranked search engine website, by optimising the use of website development elements and the general management of website. Students should be able to distinguish between different types of available search engines and understand website goal conversion. The subject's main topics include components of search engine, understanding search engine optimisation, website search strategies, managing website contents, evaluation approaches and methods. (Total tuition time: ± 90 hours)

**WEB MANAGEMENT IIIB (WEB30BT)****1 X 3-HOUR PAPER****(Subject custodian: Department of Informatics)**

The student who successfully completes this subject should demonstrate knowledge and understanding of the nature of Electronic Commerce and have appreciation of various applications of E-commerce in real life situation by identifying and explaining the principles of E-commerce; identifying and implementing the various e-commerce technology and infrastructures; applying the various selling and marketing strategies on the web, identifying and applying the various business strategies; identifying the e-commerce environment, differentiating between the web server hardware and software; identifying and explaining the various software, security, payment systems and plans for e-commerce. (Tuition time: ± 60 hours)

