DEPARTMENT OF COMPUTER SCIENCE

Subject information (overview of syllabus)
The syllabus content is subject to change to accommodate industry changes. Please note: A more detailed syllabus is available at the department or in the study guide that is applicable to a particular subject. On 11 August 2014, syllabus content was defined as follows:

ADVANCED DATABASE MANAGEMENT SYSTEMS III (AVD302T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
This unit builds upon students’ general understanding of database management systems, enabling them to design and implement complex database systems. This subject has a strong element of practical database design and implementation. (Total tuition time: ± 60 hours)

ADVANCED DEVELOPMENT SOFTWARE IV (ADH401T) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
The primary purpose is on developing PL/SQL web applications using oracle 10g/11g as a tool and Oracle Application Server configurations. The contents include generating HTML output from PL/SQL, passing parameters to a PL/SQL web application, performing network operations within PL/SQL stored procedures and embedding PL/SQL code in web pages and the use of JavaScript in PL/SQL web applications. (Total tuition time: ± 40 hours)

ADVANCED INTERNET PROGRAMMING AND E-COMMERCE IV (ADN401T) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
Advanced Internet programming and e-commerce on the Oracle Web platform. (Total tuition time: ± 40 hours)

ADVANCED MULTIMEDIA PROGRAMMING IV (MMO401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
This subject covers the use of advanced multimedia concepts in the context of education. The topics covered include approaches to education and different multimedia approaches. After completing this subject, the student will know how to apply pedagogic paradigms to the design and development of multimedia education systems, be able to decide which multimedia approach is appropriate for a given context, and manage the development of a multimedia system from conception to deployment. In addition, the student will gain practical experience in working with a limited number of multimedia systems. (Total tuition time: ± 40 hours)

ADVANCED TECHNICAL PROGRAMMING IV (ADU401T) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
AIM: This subject focuses on introducing students to server-side component architecture using Enterprise Java Bean (EJB3.0). The students are exposed to EJB specifications to provide a standard way to implement the back-end "business" code typically found in enterprise applications. OBJECTIVES: Understanding EJB in relation to the J2EE architecture, annotation-based EJB programming model and persistence model for entity beans. KEY TOPICS: Session bean, entity bean, message-driven bean, annotations, web services. (Total tuition time: ± 40 hours)

APPLICATION TECHNOLOGY IV (ATE401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
PURPOSE: To equip students with skill and knowledge in the use of software design patterns. The subject exposes students to the commonly used creational, structural and behavioural design patterns. (Total tuition time: ± 40 hours)

ARTIFICIAL INTELLIGENCE IV (AIT401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Systems Engineering)
AIM/PURPOSE: To introduce the fundamentals of the art of creating machines that perform functions that require intelligence when performed by people. The field includes Problem solving; Communicating, perceiving and acting; Learning; Knowledge, reasoning and planning; Uncertain knowledge and reasoning. (Total tuition time: ± 26 hours)
BUSINESS ANALYSIS IV (BUA401T)  
(Subject custodian: Department of Informatics)  
1 X 3-HOUR PAPER  
Business analysis is critical in identifying the business needs of end users and other stakeholders to determine the appropriate solution to a business problem. Focus is primarily on business analysis, and discusses how to obtain success in business analysis. Six business analysis knowledge areas are discussed in detail. On successful completion of this subject, the student will be able to: specify and model requirements for an IT business solution, investigate business problem or opportunity within an organisation, analyse and document solution requirements for an IT organisation and support project manager throughout solution development, implementation and testing to ensure that requirements are met. (Tuition time: ± 54 hours)

BUSINESS COMMUNICATION I (BUC101B)  
(Subject custodian: Department of Informatics)  
1 X 3-HOUR PAPER  
Students develop the basic communication skills and concepts required at the interpersonal level. They acquire the ability to relate these to the broader information needs of organisations, so that the knowledge of information systems and appropriate communication may be applied intelligently and effectively. (Total tuition time: not available)

BUSINESS FUNDAMENTALS IV (BAB401T)  
(Subject custodian: Department of Informatics)  
1 X 3-HOUR PAPER  
Business analysis is critical in identifying the business needs of end users and other stakeholders to determine the appropriate solution to a business problem. Focus is primarily on business analysis, and discusses how to obtain success in business analysis. Six business analysis knowledge areas are discussed in detail. On successful completion of this subject, the student will be able to: specify and model requirements for an IT business solution, investigate business problem or opportunity within an organisation, analyse and document solution requirements for an IT organisation and support project manager throughout solution development, implementation and testing to ensure that requirements are met. (Total tuition time: ± 54 hours)

BUSINESS ORGANISATION I (BUO101B)  
(Subject custodian: Department of Informatics)  
1 X 3-HOUR PAPER  
Students acquire an understanding of the various types of organisations, the principal functional areas within organisations and the needs of organisations, as well as the needs of employees in the workplace. (Total tuition time: not available)

BUSINESS PROJECTS MANAGEMENT II (BPJ201B)  
(Subject custodian: Department of Informatics)  
1 X 3-HOUR PAPER  
Students are familiarised with the principles of project management and control, and examine the impact of people on projects. Particular attention is paid to information technology projects, such as systems development and implementation. (Total tuition time: not available)

COMMUNICATION NETWORKS V (COB501T)  
(Subject custodian: Department of Computer Science)  
CONTINUOUS ASSESSMENT  
A study of advanced communication networks. (Total tuition time: not available)

COMPUTER TECHNOLOGY I (COY101B)  
(Subject custodian: Department of Computer Science)  
1 X 3-HOUR PAPER  
Students are equipped with a detailed and secure foundation in the various computer technologies required to function effectively in a technical role. (Total tuition time: not available)

COMPUTING FUNDAMENTALS IA (CFS10AT)  
(Subject custodian: Department of Computer Science)  
1 X 3-HOUR PAPER  
The student is introduced to to the fundamentals of computers and information systems, computer organisation and data processing. (Total tuition time: ± 90 hours)

COMPUTING FUNDAMENTALS IB (CFS10BT)  
(Subject custodian: Department of Computer Science)  
1 X 3-HOUR PAPER  
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)

**DATA ENGINEERING IV (DEG401T) 1 X 3-HOUR PAPER**
*(Subject custodian: Department of Computer Science)*

The aim of this subject is to address the issues of data representation for data mining. OBJECTIVE: On completion of this subject, students should be able to prepare and process data for meaningful interpretations. KEY TOPICS: Data engineering models, data mining tool, normalisations and redistributing variables, introduction to Neural network. (Total tuition time: ± 40 hours)

**DATA ENGINEERING V (DEG501T) CONTINUOUS ASSESSMENT**
*(Subject custodian: Department of Computer Science)*

AIM: To introduce the students to the tools and techniques of data mining, data warehousing and knowledge engineering. OBJECTIVES: On completion of this subject, the students should be able to apply the various tools and techniques of data mining, data warehousing and knowledge engineering. Introduction to Cloud concepts. KEY TOPICS: Data sampling, modelling, processing, decision tree induction, model evaluations, classification tools, clustering tools, association tools, genetic algorithm, customer-relationship management. (Total tuition time: ± 40 hours)

**DATABASE DESIGN AND DEVELOPMENT II (DDD201B) 1 X 3-HOUR PAPER**
*(Subject custodian: Department of Computer Science)*

An essential introduction to modern database technology and the development of database systems, with the emphasis on the practicalities of using database systems in the ongoing development of information systems. (Total tuition time: ± 60 hours)

**DATABASE ADMINISTRATION IV (DBA401T) 1 X 3-HOUR PAPER**
*(Subject custodian: Department of Computer Science)*

An introduction to the management of database systems. Problems in current database administration, as well as possible solutions to those problems, are discussed. The subject focuses on the design of data structures and storage techniques, tuning, distributed systems, database administration and support tools. (Total tuition time: ± 40 hours)
DATABASE SYSTEMS IV (DBS401T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
PURPOSE: This subject assumes knowledge of databases and builds on this existing database knowledge
by presenting database design and technology concepts. Fundamental database concepts are covered as
well as relational database models and normalisation; entity-relationship modelling; transaction management
and concurrency control; distributed database management systems; object-orientated databases; client/
server systems; data warehousing, data mining and also databases in electronic commerce. (Total tuition
time: ± 40 hours)

DECISION SUPPORT SYSTEMS III (DPY302T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
Functions and applications of computer-based information systems used in business for the support of manage-
ment – management information systems, decision support systems, executive information systems, etc.
(Total tuition time: ± 60 hours)

DECISION SUPPORT SYSTEMS IV (DPY401T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
The subject focuses on decision support systems and business intelligence, human decision making pro-
cesses, decision making, systems, modeling and support, decision support systems concepts, methodologies
and technologies, modeling and analysis, data mining for business intelligence, artificial neural networks for
data mining, text and web mining, data warehousing and the CART algorithm. (Total tuition time: ± 40 hours)

DEVELOPMENT SOFTWARE IA (DSO15AT)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
AIM: To learn to solve programs using the basic programming principles, and then practically apply that
knowledge in VB.NET. 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, write
algorithms containing sequential steps, selection and iteration control structures, applying them in VB.NET.
KEY TOPICS: Basics of problem solving, solving problems using the sequential control structure, the selection
control structure, the iteration control structure and these three control structures together, all applied in VB.NET.
(Total tuition time: ± 72 hours)

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 (DSO15BT)  1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
AIM: To expand on the already obtained knowledge of DSO15AT, to solve programs using the basic programming
principles, and then practically apply that knowledge in VB.NET. OBJECTIVES: The knowledge obtained in
DSO15AT enables the student to write an algorithm using functions and subprocedures, write an algorithm
containing one-dimensional arrays, do string manipulation and use standard functions, all applied in VB.NET.
KEY TOPICS: Modularisation, functions, procedures and one-dimensional arrays, applied in VB.NET. (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 subprocedures, 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)

DEVELOPMENT SOFTWARE IIIA (DSO34AT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
PURPOSE: To introduce students to the various database concepts, the design, implementation and management of a database system. The subject will prepare the student for practical applications in the design, implementation and management of database systems. The student should be competent in: the principles of developing and implementing small IT systems. On completion, the student should be able to create, maintain and administer databases according to the DBLC. Students should also be able to grasp how the database design fits into the Software Development Life Cycle. (Total tuition time: ± 59 hours)

DEVELOPMENT SOFTWARE IIIB (DSO34BT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Computer Science)
The subject is project-based and integrates knowledge across all study fields of the qualification including: systems analysis and design; networking principles; project management; database design and implementation; and programming. On completion of the subject, the student should have the ability to: analyse and design software solutions to industry-related Information Technology problems and utilise the required technical skills to effectively implement the designed solutions in a distributed IT environment. (Total tuition time: ± 59 hours)

DEVELOPMENT SOFTWARE IV (DSO401T) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
The focus is on advanced PL/SQL programming using Oracle 10g/11G as a tool, the content includes PL/SQL tables, Nested blocks in PL/SQL, Dynamic SQL and Dynamic PL/SQL blocks, recompiling functions and procedures, package forward declarations, package dependency, package overloading, bulking in PL/SQL and creating database triggers. (Total tuition time: ± 40 hours)

DIGITAL ENTERPRISE V (DEV511T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Informatics)
An analysis of how businesses are changing in the digital era. (Total tuition time: ± 54 hours)

E-COMMERCE I (EKM111T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Informatics)
Students acquire a thorough understanding of the major issues associated with the development of e-commerce solutions and applications, particularly in relation to both the business and commercial considerations and the technical requirements. (Total tuition time: not available)

ELECTRONIC MARKETING I (EMK101T) CONTINUOUS ASSESSMENT
(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; and identifying and explaining the various software, security, payment systems and plans for e-commerce. (Tuition time: ± 60 hours)
ENTERPRISE NETWORKING II (ENW201B)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
Students acquire an understanding of the basic functions and characteristics of the telecommunications networks used by businesses for transporting information. (Total tuition time: not available)

F

FOUNDATION ACADEMIC AND LANGUAGE SKILLS (FPALS01)  1 X 3-HOUR PAPER
(Subject custodian: ICT First Years’ and Foundation Unit)
AIM/PURPOSE: To provide a sound foundation for, and to enhance basic language proficiency and academic skills necessary for reading, writing and studying in an ICT environment. OBJECTIVES: Analyse, adjust and improve study skills. Apply research skills in assignments. Interpret and reflect on all available and relevant resource material in proper English. Communicate in a comprehensible and clear manner in both a general and subject-specific manner showing cultural sensitivity. Demonstrate intermediate-level proficiency in oral and written English. KEY TOPICS: Learning styles, study skills, research skills, communication skills and cultural sensitivity, English vocabulary and grammar, Reading and writing skills. (Total tuition time: ± 84 hours)

FOUNDATION ICT MATHEMATICAL SKILLS (FPITM01)  1 X 3-HOUR PAPER
(Subject custodian: ICT First Years’ and Foundation Unit)
AIM/PURPOSE: The focus of the subject is to ensure students have the necessary mathematical and numeracy skills needed for ICT. Students will also be introduced to abstract logical reasoning and computational thinking skills. These skills are further developed through practical exercises relating to various day-to-day problem-solving activities. OBJECTIVES: To develop the problem solving skills as well as the computational thinking skills of the student and therefore prepare the student for the programming subjects to follow. KEY TOPICS: The Number System and Basic Arithmetic; Introduction to Algebra: Expressions and Equations; Fractions and Decimals, Algebraic Fractions; Percentages; Ratio and Rate; Perimeter, Area and Volume; Measuring Systems and Units; Time, distance and speed; Cartesian Plane and Coordinates; Algebraic functions; Matrices. (Total tuition time: ± 96 hours)

FOUNDATION INFORMATION AND SOFTWARE DEVELOPMENT SKILLS (FPIDS01)  1 X 3-HOUR PAPER
(Subject custodian: ICT First Years’ and Foundation Unit)
AIM/PURPOSE: To prepare students for computer programming by developing logical, critical and lateral thinking skills. OBJECTIVES: To develop the students’ logical thinking and problem-solving skills as preparation for programming. Abstract logical reasoning and computational thinking skills will therefore be used to solve problems. KEY TOPICS: Brain teasers as introduction to problem-solving; analysis and solving of word problems; solving of various day-to-day problems; introduction to algorithmic problem solving - sequence, basic selection, basic repetition steps; statistics; financial matters. (Total tuition time: ± 96 hours)

FOUNDATION PRESENTATION AND REPORTING SKILLS (FPPRS01)  1 X 3-HOUR PAPER
(Subject custodian: ICT First Years’ and Foundation Unit)
AIM/PURPOSE: To provide a sound foundation for, and to enhance basic language proficiency skills necessary for reading and writing in an ICT environment with specific reference to presentations and reports. OBJECTIVES: Preparation of effective and professional reports and Powerpoint presentations. Interpret, relate and reflect on all available and relevant resource material in proper English. Communicate orally in a comprehensible and clear manner specifically when presenting various IT topics, demonstrate intermediate-level proficiency in written English. KEY TOPICS: Personality types; emotional intelligence; self management; stress and time management; team dynamics; conflict, negotiation and assertiveness; dealing with change; relationship management; reading, writing and presentation skills; English vocabulary and grammar. (Total tuition time: ± 84 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) 1 X 4-HOUR COMPUTER-BASED  
*(Subject custodian: Department of Computer Science)*

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)

H

HUMAN COMPUTER INTERACTION V (HCA501T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Computer Science)*

AIM: To gain advanced knowledge of Human Computer Interaction design and development. Contents include usability goals, usability design and principles, the process of interaction design, prototypes, usability engineering life-cycle model, data gathering, understanding users, activity, designing for collaboration and communication, affective aspects, persuasive technologies, identifying needs and establishing requirements, design, prototyping and construction, introducing evaluation, usability testing and field studies. (Total tuition time: ± 40 hours)

HUMAN COMPUTER INTERFACE DESIGN IV (HCI401T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Computer Science)*

AIM: To teach students knowledge and skills require for designing interactive products to support the way people communicate and interact in their everyday and working life. Students should know how to generate user requirement, design, evaluate and implement interactive computing systems for human use with other human factors and ergonomics. The subject's main topics include: the use of general HCI principles to design screens for Windows application and for the Web; understanding users and user-centred design; identifying needs and establishing requirements; doing conceptual design, prototyping and construction of Human Computer interfaces for different types of users. (Total tuition time: ± 40 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, IDC30BF, IDC30BH) 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)

INDUSTRY EXPOSURE IIIB (IDC30BT) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Computer Science)*

A career-orientated work integrated learning aimed at integrating academic learning with practical skills as required by the industry. (No formal tuition)

INFORMATION AND TECHNOLOGY MANAGEMENT IV (ITA401T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Informatics)*

This subject provides concepts and frameworks for understanding the potential impact of information technology (IT) on business strategy and performance. The subject focuses on the implications of increased digitisation for defining business strategies and operating models, and explores the roles of both general managers and IT executives in using IT to achieve operational excellence and business agility. On successful completion of this subject, the student will be able to develop an IT Strategy for a digital enterprise; evaluate how IT will shape future businesses and the contribution of enterprise architecture; evaluate the risk and benefits of digitised processes and compare strategically whether to perform those processes internally or externally; assess the impact of globalisation; motivate why some firms are better able to convert their IT investments into business value, and implement steps to ensure effective IT decision making. (Total tuition time: ± 54 hours)
INFORMATION SECURITY IV (ITU401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Information Technology)
Encryption and decryption algorithms, protocols, operating systems, databases and network security. (Total tuition time: ± 40 hours)

INFORMATION SECURITY V (ITU501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Computer Science)
Advanced network security is covered in this subject. (Total tuition time: ± 40 hours)

INFORMATION SYSTEMS IA (ISY13AT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
AIM: To introduce the student to the fundamentals of computers and information systems, computer organisation and data processing. This subject covers a vast spectrum of information, information systems and technology which includes teaching students to become computer literate, understanding parts of the computer, the Use of Internet, building Application Software, Networking and security in the business world. (Total tuition time: ± 60 hours)

INFORMATION SYSTEMS IB (ISY13BT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
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)

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)

INFORMATION SYSTEMS IIIA (ISY34AT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
The purpose of this subject is: to provide the knowledge and practical skills needed to develop and present a computerised design of the system that students plan and analyse, using a system design and development methodology. This subject covers system analysis and design following the object oriented approach. A model driven approach is adopted starting with use cases and scenarios followed by defining problems domains classes through to detailed design models. The students will gain in-depth knowledge of OO software design and design patterns compliant with UML 2.0 modeling standards supported by the Unified Process as a systems development methodology covering the entire Unified Process Life Cycle (UPLC). (Total tuition time: ± 60 hours)

INFORMATION SYSTEMS IIIB (ISY34BT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
PURPOSE: To introduce students to concepts of project management within an ICT environment. Topics that are covered include: project life cycle, project process groups, project management knowledge areas which include risk, time, cost, and scope management. A student is expected to have knowledge of systems analysis and design in the IT field. On completion, students are expected to be competent in project selection, project scheduling using Gantt/PERT charts, project cost estimation and project risk analysis. (Total tuition time: ± 59 hours)
INFORMATION TECHNOLOGY SKILLS IA (ITS11AT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Informatics)
Thinking skills, learning styles, study skills, research skills, presentation skills, legal issues in IT, communication skills, cultural sensitivity. (Total tuition time: ± 36 hours)

INFORMATION TECHNOLOGY SKILLS IB (ITS11BT) 1 X 3-HOUR PAPER
(Subject custodian: Department of Informatics)
Personality types, emotional intelligence, self-management, stress and time management, team dynamics, conflict, negotiation and assertiveness, dealing with change, relationship management. (Total tuition time: ± 54 hours)

INNOVATION IN IT V (III501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Computer Science)
Principles of innovation in organisations. Application of IT for effective innovation. Principles of standardisation in IT. Innovation in relation to standardisation. (Total tuition time: ± 40 hours)

INTERNET AND INTRANET SECURITY II (IAI201B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
Students acquire the skills required to avoid security breaches and develop strategies for secure systems. (Total tuition time: ± 60 hours)

INTERNET PROGRAMMING AND E-COMMERCE IV (ITC401T) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
AIM: To introduce students to the Rapid application development with the Ruby on Rails framework and databases for interacting with, and storing data for end users. Topics include Advanced architectural design of e-commerce systems with high availability and scalability, developing front-end/back-end functionality, security/logins, system administration etc. (Total tuition time: ± 40 hours)

INTERNET PROGRAMMING I (ITI101B) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
Students acquire an understanding of the core principles of Java and they learn how to produce well-designed, effective applications using some of the more advanced features of the language. (Total tuition time: ± 60 hours)

INTERNET PROGRAMMING II (ITI201B) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
Client-side programming using HTML and scripting languages. Advanced client-side programming. (Total tuition time: ± 60 hours)

INTERNET PROGRAMMING IIA (ITI20AT) 1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
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 (ITI20BT) 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) 
PURPOSE: Tnroduce students 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)

INTERNET SYSTEMS ADMINISTRATION II (ISA201B) 1 X 3-HOUR PAPER  
(Subject custodian: Department of Computer Science) 
Students acquire the knowledge to manage Internet infrastructures. (Total tuition time: ± 60 hours)

INTERNETINGERING PRINCIPLES I (IWR101T) 1 X 3-HOUR PAPER  
(Subject custodian: Department of Computer Science) 
Students acquire a thorough understanding of how networks operate. Networks are now a core aspect of every level of computing. The wide acceptance of the Internet means that the smallest business or user of a personal computer has a need to connect one computer to another. (Total tuition time: ± 60 hours)

IT LAW V (ITW501T) CONTINUOUS ASSESSMENT  
(Subject custodian: Department of Informatics) 
Interpretation and implementation of Bills and Acts relevant to the IT industry, e.g. Electronic Communication and Transaction Act and Access to Information and Privacy acts. (Total tuition time: not available)

IT SERVICES AND PROJECTS V (SPV511T) CONTINUOUS ASSESSMENT  
(Subject custodian: Department of Informatics) 
Understanding the character of managing IT department offering. (Total tuition time: ± 54 hours)

KNOWLEDGE MANAGEMENT IV (KNM401T) 1 X 3-HOUR PAPER  
(Subject custodian: Department of Informatics) 
This subject is aimed at extending the skills of the students by introducing students to the various Knowledge Management concepts, design, implementation and management of KNM systems, as well as an overview of challenges that organisations face during the implementation of KNM initiatives. As the economy increasingly moves towards a knowledge-based economy, the ability to manage knowledge becomes a matter of competitive survival for organisations. Principles and practice of knowledge management in organisations, therefore, become the focal point of this subject. On completion of the subject, students will be able to identify and apply the theoretical and practical knowledge management principles to address management pitfalls, manage these knowledge management challenges; and implement the relevant knowledge management steps to ensure success within the context of the organisation. (Total tuition time: ± 54 hours)
**KNOWLEDGE TECHNOLOGIES V (KNT511T) **
*CONTINUOUS ASSESSMENT*

*(Subject custodian: Department of Informatics)*

This subject deals with Knowledge engineering and technologies underpinning knowledge systems, such as decision support systems, group support systems, expert systems, data warehousing, data mining, document management and information searches. (Total tuition time: ± 54 hours)

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**MULTIMEDIA DESIGN IIIA (MMZ30AT) **
*1 X 4-HOUR COMPUTER-BASED*

*(Subject custodian: Department of Computer Science)*

PURPOSE: To provide overview coverage of advanced design principles and applications. The theory component covers the basic elements and principles of two- and three-dimensional design, cultivate creativity, problem seeking and problem solving and the aspects and elements of time design. The practical component aims to assist in teaching the basics covered in the theory component. Microsoft PowerPoint and Adobe Photoshop will be used as tools. The student should be able to explain and apply design elements and concepts and design and develop multimedia solutions by using various technologies and packages. Content include: design and art theory, design concepts and principles, two-dimensional and three-dimensional design, time design, visual communication, concepts of critical thinking, cultivating creativity and idea forming, presentations skills and design, vector design, script writing, storyboarding and video editing. (Total tuition time: ± 60 hours)

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**MULTIMEDIA DESIGN IIIB (MMZ30BT) **
*1 X 4-HOUR COMPUTER-BASED*

*(Subject custodian: Department of Computer Science)*

AIM: To teach students the process of creating a video. Qualified students should understand the basics of sound, how to draw sound graphs, how to create a storyboard, and how to edit videos and sounds. Content include: Audacity, Adobe after effects. Advanced content include: Camera skills, storyboarding, use lights in studio, audacity can be used to record sound, modify a sound file which require functions such as cut, copy, paste, and amplify, balancing sound. Adobe after effects allows students to create/modify video files, it requires skills such as importing files, keying, color range, add layers, add text, text effects, fade in/out, and rendering. (Total tuition time: ± 60 hours)

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**MULTIMEDIA I (MTM101T) **
*1 X 3-HOUR PAPER*

*(Subject custodian: Department of Computer Science)*

Exploring the techniques involved in the design of effective multimedia interactive systems. The emphasis is on understanding the concepts of multimedia and their application. (Total tuition time: not available)

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**MULTIMEDIA PROGRAMMING IIIA (MMX30AT) **
*1 X 4-HOUR COMPUTER-BASED*

*(Subject custodian: Department of Computer Science)*

AIM: To expose the student to solving real-world problems through the creation of interactive objects, basic interactive solutions, or fully developed 3D simulation applications using EON Studio or EON Professional. With background knowledge in 3D design from earlier subjects, students are further introduced to the concept of building low poly models using 3Ds Max, which are then imported into the EON Studio environment to make it functional, real and interactive. When completed, the student should be well equipped to create visually stimulating interactive applications for use in the sciences, medicine, entertainment, engineering and educational fields. These applications, including virtual reality, simulations and games help to bring real or imaginary objects to life. (Total tuition time: ± 60 hours)

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**MULTIMEDIA PROGRAMMING IIIB (MMX30BT) **
*1 X 4-HOUR COMPUTER-BASED*

*(Subject custodian: Department of Computer Science)*

This subject teaches 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, advanced use of functions, security, configuration, exceptions and error handling, debugging; choosing a Database for PHP; SQL; 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)
MULTIMEDIA PROGRAMMING IV (MMX401T) 1 X 3-HOUR PAPER

*Subject custodian: Department of Computer Science*

This subject deals with advanced concepts in computer animation. The topics covered are motion capture and advanced principles of animation, and scripts and production documentation for animated productions. After completing this subject, the student will be able to discuss motion capture, discuss the technical principles of animation in-depth and prepare for motion capture or animation sessions by analysing scripts and preparing supporting documentation and setup a production pipeline. In addition, the student will practice some practical aspects of the multimedia production process. (Total tuition time: ± 40 hours)

MULTIMEDIA TECHNOLOGY IIA (MMN20AT) 1 X 3-HOUR PAPER

*Subject custodian: Department of Computer Science*

**PURPOSE:** To introduce the student to the various multimedia elements, digital still image photography and digital editing skills. The student will be competent in all multimedia concepts and have a solid foundation in the planning process and design considerations, while covering industry standard applications and emerging technologies. The student will also be competent in digital photography capturing, editing, manipulation and application. This subject consists of two components over one semester. The theory component covers the most essential multimedia concepts for the Web, planning the multimedia Web site, designing the user interface and the five multimedia elements: text, graphics, animation, sound, and video. The practical component consists of basic digital photography and digital editing skills using Adobe Photoshop CS as a tool. (Total tuition time: ± 60 hours)

MULTIMEDIA TECHNOLOGY IIB (MMN20BT) 1 X 4-HOUR COMPUTER-BASED

*Subject custodian: Department of Computer Science*

**AIM:** To introduce the virtual world to students. Students will create any objects in 3D with 3D’s Max, as well as animation. Students should have the ability to create virtual 3D objects as well as animation which can be applied to virtual reality or create a gaming character with animation. Content include: Complete coverage of 3Ds’ Max, various modeling skills as well as character animation. Advanced content include: model an object, create lights, create background images, apply material to an objects, effects on the material, generate path for an object, creating bone objects to characters, apply animation to character, and render a scene to a video file. (Total tuition time: ± 60 hours)

NETWORK COMMUNICATION SYSTEMS MANAGEMENT III (NCS302T) 1 X 3-HOUR PAPER

*Subject custodian: Department of Computer Science*

Building on earlier knowledge and equipping students with the knowledge and skills to communicate effectively with both technical and managerial staff in a communications systems context. (Total tuition time: not available)

NETWORK SUPPORT I (NST101B) 1 X 3-HOUR PAPER

*Subject custodian: Department of Computer Science*

Networks, while once used widely in large organisations only, now form an integral part of every area of computing. The widespread acceptance of the Internet means that the smallest business or personal user of a computer has a need to connect one computer to another. This subject teaches students to fulfil that need and to cover all the common aspects of networking. (Total tuition time: ± 60 hours)

NETWORKS IV (NWS421T) 1 X 3-HOUR PAPER

*Subject custodian: Department of Information Technology*

A study of advanced network management. (Total tuition time: ± 20 hours)

NEURAL NETWORKS V (NEU501T) CONTINUOUS ASSESSMENT

*Subject custodian: Department of Computer Systems Engineering*

Genetic algorithms and the application of neural networks in different environments. (Total tuition time: not available)

NEW TECHNOLOGY PROGRAMMING IV (NTP401T) 1 X 3-HOUR PAPER

*Subject custodian: Department of Computer Science*

**AIM/PURPOSE:** To expose students to a programming paradigm not covered by typical application design strategies. **OBJECTIVE:** The student must be able to identify mobile agents from similar technologies, create a mobile agent solution, understand the privacy and security concerns related to mobile agents and theorise on improvements which can be brought to bear on this paradigm. **KEY TOPICS:** Software agents, Intelligent Agents, AI, Relocatable code, RPC’s, RMl’s, Process Migration, Execution environments, Killer Apps. (Total tuition time: ± 40 hours)
OBJECT-ORIENTATED PROGRAMMING METHODS II (OOP201B)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Computer Science)
Students are exposed to extensive coverage of the three basic programming structures. (Total tuition time: ± 60 hours)

OPERATING SYSTEMS IV (OSY431T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Systems Engineering)
The main objective of this subject is to design and program a simple operating system (using layered technology), programmed in Assembler, C or C++ programming languages. The simple operating system will have a programmed boot process (written in Assembler only), a kernel (can be written in Assembler, C or C++ combination), file system (can be written in Assembler, C or C++ combination), and command interpreter or shell (can be written in Assembler, C or C++). Students should have prior (and solid) knowledge of operating systems and C or C++ programming language before embarking on this subject. The subject starts off with a revision of Assembler programming only. No revision of C or C++ is done, as this is required from students. When time permits, advanced concepts (in theory only), such as memory management, process management and process scheduling, as well as types of operating systems, such as distributed, parallel, embedded and/or real-time operating systems, are evaluated theoretically. (Total tuition time: ± 26 hours)

PC SUPPORT I (PUZ101B)  1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Systems Engineering)
The A+ (PC Support) syllabus gives students a thorough understanding of the technical and practical skills involved in PC technical support and is divided into two distinct parts, namely hardware and software support. (Total tuition time: ± 60 hours)

PERSONAL ATTRIBUTES/REFLECTION ON PRACTICES IV (PAA401T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
Attributes, skills and tools for delivering service in network environments. (Total tuition time: ± 40 hours)

PRACTICAL BUSINESS PROJECT I (PBB101B)  1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
Students are given practical experience in the application of the subjects studied as electives. All work for a project should be additional to any work done for the subject or as an assignment. (Total tuition time: not available)

PRACTICAL BUSINESS PROJECT II (PBB201B)  1 X 4-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)
Students are given practical experience in the planning, analysis, design, documentation and (as far as possible) development, testing, implementation and project management of a computer-based system to enable them to play a significant role in a systems development project. (Total tuition time: ± 60 hours)

PRINCIPLES OF ENQUIRY AND THE FUTURE OF IT IV (PAB401T)  1 X 3-HOUR PAPER
(Subject custodian: Department of Computer Science)
Analysing the future possibilities of IT and how the principles of enquiry can operate in such an environment. (Total tuition time: ± 40 hours)

PRINCIPLES OF RESEARCH IV (PAJ411T)  CONTINUOUS ASSESSMENT
(Subject custodian: Department of Computer Science)
This subject prepares students to obtain the necessary skills in doing proper research to deliver a proper researched report. The subject also looks at the basics of paradigms, methodologies, and techniques of research in the behavioural sciences, and their application in information technology. On completion of the subject, students will be able to apply the basic paradigms, methodologies and techniques; apply different methodologies in different scenarios; recommend which data collection technique is necessary; apply correct research methods in the ICT environment, and apply the appropriate tools for collecting data in the ICT environment. Project topics and research questions in line with the department niche area. (Total tuition time: ± 54 hours)
PROFESSIONAL PRACTICE PROJECT IV (PPJ400T)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
Managing the development of information systems and the specification and design of network systems. (Total tuition time: ± 80 hours)

PROFESSIONAL SYSTEMS ENGINEERING IV (PRZ401T)  
(Subject custodian: Department of Computer Science)  
1 x 3-hour paper  
Managing the development of information systems. Specification and design of networks. (Total tuition time: ± 40 hours)

PROFESSIONAL SYSTEMS ENGINEERING V (PRV511T)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
Knowledge and skills required to manage the development of IS by using workgroup products, ERP systems, customer relations, supply chain and quality management. (Total tuition time: ± 40 hours)

PROGRAMMING CONCEPTS I (PGC101T)  
(Subject custodian: Department of Computer Science)  
1 x 4-hour computer-based  
Java has become an important language for programming on the Internet and, in particular, for website development. For anyone planning a career in this area, knowledge of Java is essential. The student will gain an understanding of the core principles of Java and introduce well-designed, effective applications that use some of the more advanced features of the language. (Total tuition time: ± 60 hours)

PROJECT IV (PJT410B, PJT410E, PJT410H, PJT410I)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
This subject is an IT project that includes IT research and writing a research report. On completion of the subject, students will be able to apply the research and presentation skills obtained in Principles of Research, apply the correct Harvard reference method, demonstrate writing skills, and demonstrate research skills according to the project topics and research questions in line with the department niche area. (Total tuition time: ± 26 hours)

PROJECT MANAGEMENT IV (PJG401C)  
(Subject custodian: Department of Informatics)  
1 x 3-hour paper  
This subject aims to enhance students' knowledge of project management. The student who successfully completes this subject must be able to apply project management skills to any IT related project. On completion of the subject, students will be able to define, facilitate, document, and manage the project requirements for information technology projects. The student will construct the relevant template based on industry-accepted standards, apply the appropriate techniques that are geared to significantly improve requirements, collection and documentation; and assess the roles of various players (project leaders, business analysts, client advocates, and customers) in determining the success of the requirements definition for IT projects. (Total tuition time: ± 54 hours)

RESEARCH IN INFORMATION NETWORKS V (RMD511C)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
AIM/PURPOSE: To introduce the basics of paradigms, methodologies, and techniques of research. OBJECTIVES: To provide a holistic overview of the research processes, be able to write a good research proposal and to implement it in the form of a dissertation. (Total tuition time: ± 40 hours)

RESEARCH IN PROFESSIONAL PRACTICE IN INFORMATION TECHNOLOGY V (RMD511D)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
It covers the basics of paradigms, methodologies, and techniques of research. Also how to conceptualise and plan research, and structure and complete a research-based project in the form of a dissertation or thesis. It provides a holistic overview of the research process and practical methods of implementing the knowledge obtained in the information technology industry or environment. (Total tuition time: not available)

SOFTWARE ENGINEERING V (SFE501T)  
(Subject custodian: Department of Computer Science)  
Continuous assessment  
Development of high-level business processes by using UML, cost and risk management and team organisation. (Total tuition time: ± 40 hours)
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Tuition Time</th>
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<tbody>
<tr>
<td>SOFTWARE ENGINEERING METHODS III (SWG302T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Students acquire experience of large-scale software development. The emphasis is on the individual working as a member of a team. (Total tuition time: ± 60 hours)</td>
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<tr>
<td>SOFTWARE-INTENSIVE SYSTEMS PROJECT MANAGEMENT IV (SIS401T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Investigating how the different systems can support management. (Total tuition time: ± 60 hours)</td>
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<tr>
<td>SOFTWARE REQUIREMENTS AND DESIGN IV (SRN401T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Software engineering subject that concentrate on software requirements, software design, software construction and software testing knowledge area in addition to software project management. (Total tuition time: ± 40 hours)</td>
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<tr>
<td>STRATEGIC BUSINESS ANALYSIS AND MODELLING V (SBG500T)</td>
<td>CONTINUOUS ASSESSMENT</td>
<td>Exploring issues surrounding the application of IT in order to define and implement strategic objectives. Reflecting on the purpose of strategic analysis, strategic planning and the application of tools and techniques during this process. (Total tuition time: not available)</td>
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<td>STRATEGIC BUSINESS ANALYSIS IV (SBA401T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Information is viewed as a strategic resource which involves the role of COI, strategic planning, aspects of ICT project management, management issues of outsourcing, ethical, and security and privacy issues. (Total tuition time: ± 40 hours)</td>
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<td>STRUCTURED PROGRAMMING METHODS I (STU101B)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Students acquire a thorough understanding of the key concepts, techniques and methods that have emerged over time as programming has evolved into a process with increasingly formalised approaches. This subject focuses on the development of transferable ideas and skills, and is not language-specific. (Total tuition time: not available)</td>
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<tr>
<td>SYSTEMS SOFTWARE IA (SSF11AT)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Basic functions of operating systems are dealt with by DOS and Windows platforms. (Total tuition time: ± 54 hours)</td>
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<tr>
<td>SYSTEMS SOFTWARE IB (SSF11BT)</td>
<td>1 X 3-HOUR PAPER</td>
<td>This subject deals with different aspects and technologies in data communication and networks, including concepts such as network architecture, transmission, protocols and a number of IEEE standards. (Total tuition time: ± 54 hours)</td>
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<tr>
<td>SYSTEM SOFTWARE IIA (SSF24AT)</td>
<td>1 X 3-HOUR PAPER</td>
<td>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)</td>
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<tr>
<td>SYSTEM SOFTWARE IIB (SSF24BT)</td>
<td>1 X 3-HOUR PAPER</td>
<td>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)</td>
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<tr>
<td>SYSTEM SOFTWARE IIIA (SSF30AT)</td>
<td>1 X 3-HOUR PAPER</td>
<td>Exposure to the latest enterprise operations systems, including Microsoft technologies. (Total tuition time: not available)</td>
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SYSTEM SOFTWARE IIIB (SSF30BT) 1 X 3-HOUR PAPER

(Subect custodians: Departments of Information Technology)
Design and implementation of a basic operating system. (Total tuition time: ± 80 hours)

SYSTEMS ANALYSIS II (SYA202B) 1 X 3-HOUR PAPER

(Subect custodian: Department of Computer Science)
Students acquire the technical, interpersonal and administrative skills that are required for systems analysts. (Total tuition time: ± 60 hours)

SYSTEMS DESIGN II (BSD201B) 1 X 3-HOUR PAPER

(Subect custodian: Department of Computer Science)
Students acquire the technical, interpersonal and management skills that are required for systems designers. Students will be able to select and use appropriate systems design techniques and tools, introduce controls to ensure availability, integrity and privacy of systems, and plan the implementation of systems. (Total tuition time: ± 60 hours)

SYSTEMS DEVELOPMENT I (SYD101B) 1 X 3-HOUR PAPER

(Subect custodian: Department of Computer Science)
Students acquire the knowledge of the methods, disciplines, techniques and skills used by IT systems to development teams. This provides them with a thorough appreciation of how such teams operate. (Total tuition time: not available)

SYSTEMS ENGINEERING SOLUTIONS V (SOL501T) CONTINUOUS ASSESSMENT

(Subect custodian: Department of Computer Science)
AIM/PURPOSE: To introduce students to the various aspects of SOA. OBJECTIVES: On completion of this subject, the students should acquire the knowledge and skills required to manage an SOA project. Have an understanding of the security concerns, activity management, composition, transaction management, and Service modelling. (Total tuition time: ± 40 hours)

TASK MANAGEMENT IV (TKM401T) 1 X 3-HOUR PAPER

(Subect custodian: Department of Informatics)
This subject deals with Knowledge engineering and technologies underpinning knowledge systems, such as decision support systems, group support systems, expert systems, data warehousing, data mining, document management and information searches. It also looks at the concepts, tools and technologies used to support decision making. With emphasis on DSS, BI, Data mining, Data warehousing, use of Web technologies, and Knowledge management implementation, potential and challenges. On completion of this subject, students will be able to examine the decision making process; propose the various technologies that can be implemented, and assess the potential and challenges of DSS, BI and knowledge technologies within an organisation. (Total tuition time: ± 54 hours)

TASK MANAGEMENT V (TKM501T) CONTINUOUS ASSESSMENT

(Subect custodian: Department of Informatics)
The subject prepares students to acquire the knowledge and skills to handle the uncertainty of task management with specific reference to the features of information system projects and assessment of human behaviour and communication. (Total tuition time: ± 54 hours)

TECHNICAL PROGRAMMING I (TPG101T) 1 X 4-HOUR COMPUTER-BASED

(Subect custodian: Department of Computer Science)
AIM: To introduce the student to object-orientated concepts and principles using the Java programming language. OBJECTIVE: 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 I (TPG111T) 1 X 4-HOUR COMPUTER-BASED

(Subject custodian: Department of Computer Science)
AIM: To introduce students to object-orientated concepts and principles using the C++ programming language.
OBJECTIVE: Students must be able to create programs that are in accordance with Object-Orientated Programming (OOP) principles, use their own and pre-defined classes in programs, use structures such as control and interactive, 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: Classes, methods, objects, selection structures, loops, strings, arrays, file manipulations, inheritance, polymorphism, exception handling. (Total tuition time: ± 140 hours)

TECHNICAL PROGRAMMING IA (TPG111AT) 1 X 4-HOUR COMPUTER-BASED

(Subject custodian: Department of Computer Science)
AIM/PURPOSE: Students should understand and be able to solve problems with the help of the Object Orientated C++ Programming language. OBJECTIVE: The student must be competent in problem-solving skills and apply the C++ language as a powerful problem-solving tool, have good knowledge of problem-solving skills and good programming style, create classes and objects, develop methods and functions using value parameters and reference parameters, include the selection structure and loop structures in programming, use library functions, especially mathematical library functions, and create personal library. Use one-dimensional array to organise memory while solving problems using the object orientated C++ programming language. KEY TOPICS: Classes and objects, selection and looping structures, library functions, one-dimensional arrays. (Total tuition time: ± 78 hours)

TECHNICAL PROGRAMMING IB (TPG111BT) 1 X 4-HOUR COMPUTER-BASED

(Subject custodian: Department of Computer Science)
AIM/PURPOSE: To cover advanced OOP (object-orientated programming) principles, including inheritance and abstract programming, as well as other advanced concepts in C++. OBJECTIVES: To enable students to create and manipulate one- and two-dimensional arrays, manipulate a collection of characters as strings, read and write data from text files, apply advanced class features. KEY TOPICS: One- and two-dimensional arrays, strings and character manipulation, text files, additional class features, inheritance, polymorphism, dynamic memory allocation. (Total tuition time: ± 80 hours)

TECHNICAL PROGRAMMING IB (TPG121BT) 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)

TECHNICAL PROGRAMMING II (TPG201T) 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. Analyse and design. OBJECTIVE: Analyse and design software solutions to industry related information technology problems, utilise the required technical skills to effectively implement the designed solutions in a distributed IT environment. KEY TOPICS: Advanced OOP, C++, dynamic object instantiation, event-driven programming, back-end classes, strategic solution planning, systematic programme design, flat file data handling. Relational database application development, defensive programming, SQL implementation, triggers, events, implementation of data structures, advanced methods in data aware application development. (Total tuition time: ± 140 hours)
TECHNICAL PROGRAMMING IIA (TPG20AT) 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. OBJECTIVE: 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 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. OBJECTIVE: 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 (TPG20BT) 1 X 4-HOUR COMPUTER-BASED

(Subject custodian: Department of Computer Science)

AIM/PURPOSE: To introduce students to programming multi-threaded applications that are able to communicate to databases. In addition network programming is introduced. OBJECTIVE: Understand life-cycle of multi-threaded application, how to store, retrieve and manipulate data in a database, creating application based on TCP/IP and UDP protocols. Java language is used for this purpose. KEY TOPICS: Multi-threading, database connectivity, Network connectivity. (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 recordstore. KEY TOPICS: The mobile environment, graphical user interfaces for mobile, event-driven programming, recordstore 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 HttpConnector 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)
TECHNICAL PROGRAMMING IV (TPG401T) 1 X 4-HOUR COMPUTER-BASED

(Subject custodian: Department of Computer Science)
AIM/PURPOSE: To introduce the students to the creation and design of software systems to support interoperable machine-to-machine interactions over a network. OBJECTIVES: To introduce students to Web services architecture, anatomy of WSDL document, SOAP-RPC, SOAP format, SOAP fault and extensions, overview of UDDI. KEY TOPICS: SOA, WSDL, SOAP, Restful Web services, UDDI. (Total tuition time: ± 40 hours)

V

VISUAL PROGRAMMING I (VIS101B) 1 X 3-HOUR PAPER

(Subject custodian: Department of Computer Science)
Students acquire a firm foundation and knowledge of the Visual Basic programming environment based on sound programming techniques. (Total tuition time: ± 40 hours)

VISUAL PROGRAMMING II (VIS201B) 1 X 3-HOUR PAPER

(Subject custodian: Department of Computer Science)
Students acquire in-depth knowledge of advanced programming design in Visual Basic. (Total tuition time: ± 40 hours)

W

WEB DATABASES I (WDS101T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Computer Science)
A study of database principles and distributed databases. (Total tuition time: ± 60 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)

WEB MANAGEMENT IV (WEM401T) 1 X 3-HOUR PAPER
(*Subject custodian: Department of Computer Science*)
This subject focuses on programming web services. Topics include the Semantic Web stack, XLM and RDF, ontologies, software agents and their use on the Semantic Web, symmetric and asymmetric cryptography works. (Total tuition time: ± 40 hours)

WEB PROJECT I (WEP101T) CONTINUOUS ASSESSMENT
(*Subject custodian: Department of Computer Science*)
An integrated project covering website design, security and programming. (Total tuition time: not available)

WEBSITE DESIGN I (WSN101T) 1 X 3-HOUR PAPER
(*Subject custodian: Department of Computer Science*)
The emphasis is on the technical skills required to create and manage a website. It will enable students to design and build relatively complex websites, based on sound design and business principles. (Total tuition time: ± 60 hours)

WEBSITE SECURITY I (WSS101T) CONTINUOUS ASSESSMENT
(*Subject custodian: Department of Computer Science*)
Students acquire knowledge and understanding of e-commerce from a security risk management and control perspective, including cryptography, firewalls and intelligent agents. (Total tuition time: ± 60 hours)