

**Alphabetical list of modules in the School of Information Technology**

# = Concurrent registration  
( ) = Examination admission  
dpw = discussions per week  
GS = combined (final) mark (semester/year mark plus examination mark) of at least 40% - 49%  
hpw = hours per week  
LP = Lecturer's permission  
lpw = lectures per week  
ppw = practicals per week  
spw = seminars per week  
TDH = Permission by head of department  
tpw = tutorials per week  
wbppw = web-based period per week  
opw = other per week

**AIM 101 Academic information management 101**

**Academic organisation:** School of Information Technology

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 6

**Module content:**

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

**AIM 111 Academic information management 111**

**Academic organisation:** School of Information Technology

**Contact time:** 2 lpw Mamelodi

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 4

**Module content:**

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

**AIM 121 Academic information management 121**

**Academic organisation:** School of Information Technology

**Contact time:** 2 lpw Mamelodi

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 4

**Module content:**

Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

**BIB 890 Dissertation: Library science 890**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 180

**CIL 122 Visual design (Autocad) 122**

**Academic organisation:** School of Information Technology

**Contact time:** 1 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Double Medium

**Credits:** 4

**Module content:**

AUTOCAD 122

**COS 110 Program design: Introduction 110**

**Academic organisation:** Computer Science

**Prerequisite:** COS 153 or COS 131 or COS 132 and Maths level 5 or WTW 133

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

The focus is on object-oriented (OO) programming. Concepts including inheritance and multiple inheritance, polymorphism, operator overloading, memory management (static and dynamic binding), interfaces, encapsulation, reuse, etc. will be covered in the module. The module teaches sound program design with the emphasis on modular code, leading to well structured, robust and documented programs. A modern OO programming language is used as the vehicle to develop these skills. The module will introduce the student to basic data structures, lists, stacks and queues.

**COS 121 Software modelling 121**

**Academic organisation:** Computer Science

**Prerequisite:** COS 153 or COS 131 or COS 132

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

The module will introduce the concepts of model-driven analysis and design as a mechanism to develop and evaluate complex software systems. Systems will be decomposed into known entities, such as design patterns, classes, relationships, execution loops and process flow, in order to model the semantic aspects of the system in terms of structure and behaviour. An appropriate tool will be used to support the software modelling. The role of the software model in the enterprise will be highlighted. Students who successfully complete this module will be able to conceptualise and analyse problems and abstract a solution.

**COS 131 Introduction to programming 131**

**Academic organisation:** Computer Science

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

\*Note: All students not registered for programmes in the School of IT need to enrol for this module.

The aim of this module is to acquire a sound knowledge of basic computer programming concepts and an introductory knowledge of data structures. The theory of these concepts, as well as design methodologies, will be investigated. Understanding rather than memorising is emphasised in order to stimulate creative thinking and the development of innovative skills amongst students in the field of computer programming. The C programming language is used to implement these concepts. At the end of the module a short introduction to object-oriented programming using C++ will be given. After completing this module, a student should be able to design and write structured, efficient programs using the C programming language, be familiar with the basic data structures, pointers and file processing, and have an introductory knowledge of advanced data structures and object-orientation.

### **COS 132 Imperative programming 132**

**Academic organisation:** Computer Science

**Prerequisite:** APS of 30 and level 5 (60-69%) Mathematics

**Contact time:** 1 ppw 1 tpw 3 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

\*Note: All students registered for degrees within the School of IT, excluding the two four year programmes, BIS (Information Science) and BIS (Publishing), need to enrol for this module.

This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language and be able to put them together in order to construct programs using types, control structures, arrays, functions and libraries. An introduction to object orientation will be given. After completing this module, the student should understand the fundamental elements of a program, the importance of good program design and user-friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

### **COS 133 Introduction to programming 1 133**

**Academic organisation:** Computer Science

**Prerequisite:** Extended programmes only

**Contact time:** 2 dpw 2 lpw 2 ppw Mamelodi Foundation module

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language, and be able to put them together in order to construct programs using types, control structures and arrays.

### **COS 143 Introduction to programming 2 143**

**Academic organisation:** Computer Science

**Prerequisite:** COS 133

**Contact time:** 2 dpw 2 lpw 2 ppw Mamelodi Foundation module

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module follows on from the previous module and introduces the concepts of functions, memory management and libraries in the imperative programming paradigm. An introduction to object orientation will be given. After completing this module and the module prerequisite, the student should understand the fundamental elements of a program, the importance of good program design and user friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

**COS 151 Introduction to computer science 151**

**Academic organisation:** Computer Science

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 8

**Module content:**

This module introduces concepts and terminology related to the computer science discipline. Topics covered include the history of computing, machine level representation of data, Boolean logic and gates, basic computer systems organisation, algorithms and complexity and automata theory. The module also introduces some of the subdisciplines of computer science, such as computer networks, database systems, compilers, information security and intelligent systems.

**COS 153 Introduction to programming 3 153**

**Academic organisation:** Computer Science

**Prerequisite:** COS 143

**Contact time:** 2 dpw 2 lpw 2 ppw Foundation module

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**

The module follows a practical programming approach. It will consolidate fundamental prior problem solving and programming knowledge.

**COS 212 Data structures and algorithms 212**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

Data abstraction is a fundamental concept in the design and implementation of correct and efficient software. In prior modules, students are introduced to the basic data structures of lists, stacks and queues. This module continues with advanced data structures such as trees, hash tables, heaps and graphs, and goes into depth with the algorithms needed to manipulate them efficiently. Classical algorithms for sorting, searching, traversing, packing and game playing are included, with an emphasis on comparative implementations and efficiency. At the end of this module, students will be able to identify and recognise all the classical data structures; implement them in different ways; know how to measure the efficiency of implementations and algorithms; and have further developed their programming skills, especially with recursion and polymorphism.

**COS 216 Netcentric computer systems 216**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

This module introduces the principles of netcentric computing that can be applied to the WWW and internet as well as to distributed applications. After completing this module, a student will have gained, as outcomes, knowledge of how to integrate various programming and web-based technologies. Particular outcomes include gaining knowledge on the concepts of client and server side programming, web-based applications, port and socket interaction, writing programmes that require remote function calls and achieving database connectivity using remote SQL calls. The supporting technologies of mark-up languages like HTML and scripting languages like JavaScript are also studied. In order to practically demonstrate that a student has reached these outcomes, students will be required to use, integrate and maintain the necessary software and hardware by completing a number of smaller practical assignments whereafter integrating all these technologies into a comprehensive and practical netcentric programming project is required.

### **COS 222 Operating systems 222**

**Academic organisation:** Computer Science

**Prerequisite:** COS 153 or COS 131 or COS 132

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

Fundamental concepts of modern operating systems in terms of their structure and the mechanisms they use are studied in this module. After completing this module, students will have gained, as outcomes, knowledge of real time, multimedia and multiple processor systems, as these will be defined and analysed. In addition, students will have gained knowledge on modern design issues of process management, deadlock and concurrency control, memory management, input/output management, file systems and operating system security. In order to experience a hands-on approach to the knowledge students would have gained from studying the abovementioned concepts, students will have produced a number of practical implementations of these concepts using the Windows and Linux operating systems.

### **COS 226 Concurrent systems 226**

**Academic organisation:** Computer Science

**Prerequisite:** COS 153 or COS 131 or COS 132

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

Computer science courses mostly deal with sequential programs. This module looks at the fundamentals of concurrency; what it means, how it can be exploited, and what facilities are available to determine program correctness. Concurrent systems are designed, analysed and implemented.

### **COS 284 Computer organisation and architecture 284**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110

**Contact time:** 1 ppw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 16

**Module content:**

This module provides the foundations on which other modules build by enabling a deeper understanding of how software interacts with hardware. It will teach the design and operation of modern digital computers by studying each of the components that make up a digital computer and the interaction between these components. Specific areas of interest, but not limited to, are: representation of data on the machine-level; organisation of the machine on the assembly level; the architecture and organisation of memory; inter- and intra-component interfacing and communication; data paths and control; and parallelism. Topic-level detail and learning outcomes for each of these areas are given by the first 6 units of 'Architecture and Organisation' knowledge area as specified by the ACM/IEEE Computer Science Curriculum 2013.

The concepts presented in the theory lectures will be reinforced during the practical sessions by requiring design and implementation of the concepts in simulators and assembly language using an open source operating system.

### **COS 301 Software engineering 301**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110 and COS 121

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 27

**Module content:**

The module exposes students to problems associated with software development on an industrial scale. Overall goals of the module are: to become familiar with the latest trends in software engineering; to understand the software engineering process and to appreciate its complexity; to be exposed to a variety of methodologies for tackling different stages of the software lifecycle; to understand and apply the concepts of systems administration and maintenance; to complete the development of a fairly large object orientation-based software product. The focus of the module is on a project that lasts the whole year. The project is completed in groups of approximately four (4) students and teaches students to take responsibility for a variety of roles within a group, and to understand the different requirements for these; to experience the advantages and problems of working in a group; professionalism with regards to particularly colleagues and clients.

After the successful completion of this module, the student will be able to: understand the psychology of a client; work in groups; and have an appreciation for planning, designing, implementing and maintaining large projects. These qualities should place the students in a position in which they are able to handle software development in the corporate environment.

### **COS 314 Artificial intelligence 314**

**Academic organisation:** Computer Science

**Prerequisite:** COS 131 or COS 110

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 18

**Module content:**

The main objective of this module is to introduce a selection of topics from artificial intelligence (AI), and to provide the student with the background to implement AI techniques for solving complex problems.

This module will cover topics from classical AI, as well as more recent AI paradigms. These topics include: search methods, game playing, knowledge representation and reasoning, machine learning, neural networks, genetic algorithms, artificial life, planning methods, and intelligent agents. In the practical part of this module, students will get experience in implementing

- (1) game trees and evolving game-playing agents;
- (2) a neural network and applying it to solve a real-world problem; and
- (3) a genetic algorithm and applying it to solve a real-world problem.

### **COS 326 Database systems 326**

**Academic organisation:** Computer Science

**Prerequisite:** INF 214 or TDH

**Contact time:** 1 lpw 2 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 18

**Module content:**

This module builds on a prior introductory module on database technology and provides more advanced theoretical and practical study material.

### **COS 330 Computer security and ethics 330**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 18

**Module content:**

This module develops an appreciation of the fundamentals and design principles for information assurance and security. Students will develop a clear understanding of the basic information security services and mechanisms, enabling them to design and evaluate the integration of solutions into the user application environment. Emphasis will be placed on services such as authorisation and confidentiality. Students will acquire knowledge and skills of Security Models such as the Bell-LaPadula, Harrison-Ruzzo Ullman and Chinese Wall Model. Students will develop a detailed understanding of the confidentiality service by focusing on cryptography and the practical implementation thereof. The student will be introduced to professional and philosophical ethics. At the end of the module students will be able to engage in a debate regarding the impact (local and global) of computers on individuals, organisations and society. The professionalism of IT staff will be discussed against national and international codes of practices such as those of the CSSA, ACM and IEEE.

### **COS 332 Computer networks 332**

**Academic organisation:** Computer Science

**Prerequisite:** COS 216

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 18

**Module content:**

The objective of this module is to acquaint the student with the terminology of communication systems and to establish a thorough understanding of exactly how data is transferred in such communication networks, as well as applications that can be found in such environments. The study material includes: concepts and terminology, the hierarchy of protocols according to the OSI and TCP/IP models, protocols on the data level, physical level and network level as well as higher level protocols. The practical component of the module involves programming TCP/IP sockets using a high level language. The emphasis throughout is on the technical aspects underlying the operation of networks, rather than the application of networks.

### **COS 333 Programming languages 333**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 18

#### **Module content:**

Programming languages are the backbone for software development. Each language has its own different syntax and semantics, but there are many common concepts that can be studied and then illustrated through the languages. The module concentrates on issues of object orientation, including delegation, iteration and polymorphism. It surveys how languages provide the basic building blocks for data and control, as well as exception handling and concurrency. At the end of the module, students will be able to appreciate the rich history behind programming languages, leading to independent principles that evolve over time. They will be skilled at using a variety of programming languages, including new paradigms such as functional, logical and scripting, and will know how to learn a new language with ease. From this experience, they will be able to apply evaluation criteria for choosing an appropriate programming language in a given scenario.

### **COS 341 Compiler construction 341**

**Academic organisation:** Computer Science

**Prerequisite:** COS 212

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 18

#### **Module content:**

This module will introduce the student to the fundamentals of compiler construction. These include: the structural difference between a high-level and a von-Neumann language, the meaning of syntax and semantics and what semantics-preserving correctness means; the concepts of regular expressions, finite automata, context-free grammars in the context of programming languages; the need to construct parse-trees for given programmes; the application of data structures and algorithms for the purpose of code-analysis, code-optimisation and register-allocation; and the limits of code-analysis in terms of undecideability and the halting problem.

After successful completion of the module, the student will have an understanding of the importance of compilers and will understand how to implement a compiler, in terms of its components, the scanner, parser, type checker and code-generator for a given grammar.

### **COS 344 Computer graphics 344**

**Academic organisation:** Computer Science

**Prerequisite:** COS 110 and WTW 126

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 18

**Module content:**

The aim of this module is to acquire a sound knowledge of the basic theory of interactive computer graphics and basic computer graphics programming techniques. The theory will cover graphics systems and models, graphics programming, input and interaction, geometric objects and transformations, viewing in 3D, shading, rendering techniques, and introduce advanced concepts, such as object-oriented computer graphics and discrete techniques. The module includes a practical component that enables students to apply and test their knowledge in computer graphics. The OpenGL graphics library and the C programming language will be used for this purpose.

**COS 700 Research report 700**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 30

**Module content:**

This module requires the student to conduct independent research under supervision of a staff member on a topic agreed upon by the student and staff member. The module consists of two parts: Research methods and the project. During the first semester, formal lectures will be presented on best research practices (counting 10 credits). The project (counting 20 credits) involves application of the taught research methods to complete a research project. The project serves as an opportunity for the student to explore one of the department's areas of research in greater depth. The end product may be a new piece of software, a model or an algorithm, or an extension of these. It could be an experimental, or theoretical piece of reasoning. The final outcome of the project is a technical report.

**COS 710 Artificial intelligence (I) 710**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on two Computational Intelligence paradigms, namely Evolutionary Computation and Swarm Intelligence. Within the Evolutionary Computation paradigm, algorithmic models of Darwinian evolution will be studied, including genetic algorithms, genetic programming, evolutionary strategies, evolutionary programming, differential evolution, cultural algorithms and co-evolution. Within the Swarm Intelligence paradigm algorithm models of social organisms found in nature will be studied, including ant algorithms and particle swarm optimisation. These algorithms will mostly be studied in the context of complex optimisation problems, including multi-objective optimisation, dynamic environments, constraints, and finding multiple solutions. Prior knowledge assumed include good programming skills and an undergraduate module in calculus.

**COS 711 Artificial Intelligence (II) 711**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on three Computational Intelligence paradigms, namely Artificial Neural Networks, Artificial Immune Systems, and Fuzzy Systems. Within the Artificial Neural Networks paradigm algorithmic models of neural learning will be studied, including supervised, unsupervised, and reinforcement learning. Aspects that influence the performance of artificial neural networks will be studied in depth. Within the Artificial Immune Systems paradigm algorithm models of different views of the human biological immune system will be studied, including negative selection, clonal selection, network theory and danger theory models. The Fuzzy Systems paradigm include models of reasoning with uncertainty, specifically fuzzy logic and rough sets. Prior knowledge assumed include good programming skills and an undergraduate module in calculus.

**COS 720 Computer and information security (I) 720**

**Academic organisation:** Computer Science

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on state-of-the-art security topics that are current and relevant to industry. The curriculum for the module is determined annually to reflect the current research directions as pursued by the information and Computer Security Architectures (ICSA) research group. The main topics include, but are not limited to: Applied security, including operating system security, secure coding, and cryptography; Trust and trust management systems; Privacy and privacy-enhanced technologies; Social Engineering. Students will be challenged to contribute innovative research ideas in the field of Computer Security by completing a number of mini projects such as writing research papers and writing software programs.

**COS 721 Computer and information security (II) 721**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on state-of-the-art information security topics that are current and relevant to industry. The curriculum for this module is annually determined to reflect the current research directions as pursued by the Information and Computer Security Architectures (ICSA) research group. The main topics include, but are not limited to: Information security management, including policies, standards and procedures; Risk management; Privacy; Ethics; Legal issues in Information Security; Information security services and technologies. Students will be challenged to contribute innovative research ideas in the field of Information Security Management by completing a number of mini projects such as writing research papers and writing software programmes.

**COS 730 Software engineering (I) 730**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module covers various perspectives of Software Engineering theory and practices. It provides an overview both of the challenges in contemporary software engineering (such

as scale, complexity and urgency) and of the recommended practices for overcoming these challenges. It will familiarise students with both the historical and current theories about activities for the design, development, deployment and ongoing operation of software. It will show how these activities aim to be predictable, repeatable, robust, value-producing, and how they aim to meet the specified requirements for the intended system users. It will also emphasise that standardisation and reuse can be important factors in successfully engineering software. The module assumes prior knowledge about Software Engineering at the level of an introductory/undergraduate module.

### **COS 731 Software engineering (II) 731**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module discusses software architecture, including the representation of designs, definitions, styles and patterns of architecture. Its themes include model-driven architecture, formal modelling and analysis, and architectural description languages. The module will show that the architecture of a software system is determined by the collection of significant design decisions made early on in the development of that system – decisions concerning the components comprising the system, repeating-patterns of system-wide aspects, and the platforms on which the system will be built. It will discuss how, once these decisions are made and subsequently followed, they end up profoundly affecting the development, deployment, use and ongoing enhancement of that system. The module assumes that the student is familiar with software development lifecycle concepts, and that she/he has been part of at least one significant software development effort. Those who have not completed COS 730 will be provided additional background.

### **COS 740 Formal aspects of computing (I) 740**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

The focus of this module is on a formal approach to deriving algorithms, known as “correctness by construction”. It relies on Dijkstra’s guarded command language (GCL) for specifying the derived algorithms. The requirements of an algorithm are initially stated in terms of a pre- and a post-condition, specified in first order predicate logic. Strategies are given for progressively refining these specifications to GCL notation which can, in turn, easily be translated into a conventional programming language. The surprising power of the method will be demonstrated. Not only are algorithms guaranteed to be correct (in the same sense that the proof of a mathematical theorem is guaranteed to be correct); they frequently turn out to be remarkably efficient. In the early part of the module, a number of well-known algorithms (such as linear and binary search, raising a number to an integer power, finding the approximate log of a number, etc) will be derived in order to become thoroughly familiar with the approach. Later various intermediate level algorithms will be derived (such as simple raster drawing algorithms, pattern matching algorithms, finding the longest string of a certain type, an algorithm to solve the majority voting problem, etc). Finally, the method will be used to derive state-of-the-art algorithms to minimize finite automata and to construct formal concept lattices. The theory necessary to understand these topics will be provided. The value-objectives of the module are: to develop an appreciation that theory can be effectively deployed to solve practical problems; to value

the elegance of the algorithmic solutions; and to value a correctness-by-construction mindset over one that is content with debugging into correctness. A basic understanding is assumed of first order predicate logic, as well as competency in mathematical reasoning.

### **COS 741 Formal aspects of computing (II) 741**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

#### **Module content:**

The status of Computer Science, including software science, as a proper “science” is closely related with our ability to construct accurate and precise models of the structures and processes of computational systems. The precision of these models is closely related with our ability to express them in formal notations with mathematical rigour, such that it also becomes possible to reason formally about relevant and interesting properties of these models. Examples of such interesting properties are logical consistency (i.e. absence of inherent contradictions), or safety properties such as deadlock freeness. This module focuses on formal languages and techniques which are suitable for such purposes. Of particular importance are process algebras with which systems of parallel and concurrent computation can be formally described. Other suitable formalisms may be discussed as well, such that the contents of this module may slightly vary from year to year.

### **COS 750 Educational software development 750**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

#### **Module content:**

This module provides the foundation to evaluate and develop educational software. It will introduce didactic principles applicable to the discipline of Computer Science. Using these principles, educational software, such as tools for teaching programming, on-line testing software, and adaptive software to name a few, can be evaluated and developed. Computer Science topics of interest are: programming environments, persistence of information and knowledge, knowledge representation etc.

### **COS 781 Data mining 781**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

#### **Module content:**

Data mining is the extraction of novel knowledge, or hidden patterns, from large data bases. The focus of this course is on how the computational intelligence techniques (such as evolutionary algorithms, swarm algorithms and neural networks) can be used for knowledge extraction. In addition, traditional machine learning techniques (such as decision trees and rule induction) will be covered. The pre-processing of data in preparation for data mining algorithms, as well as the post-processing of results after data mining, will be discussed. Exploratory data analysis and statistical data mining methods are also investigated. Finally, some attention will be given to more modern problems, such as the extraction of hidden knowledge from unstructured data, such as text and images.

It is highly recommended that students do COS 710 and COS 711, as knowledge of these modules are assumed.

### **COS 782 Generic programming 782**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module introduces the concepts of generic programming in order to generate code at compile-time. Of particular interest is the automatic generation of design pattern implementations at compile-time for use at run-time. To this end, design patterns and compile-time programming techniques such as: basic compile-time programming constructs, object allocation, generalised functors, smart pointer and multi-methods are discussed in detail and applied to design patterns.

### **COS 783 Digital forensics and investigations 783**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module will teach the basic theoretical concepts of digital forensic investigations. This module is designed to prepare a student for a wide range of people including, but not limited to, law enforcers, crime investigators and people responsible for internal incident investigations in larger organisations. Digital forensics is a relatively new and upcoming field. It is a field that is not well known by most organisations and therefore, such organisations are ill informed about the digital forensic processes required to conduct a successful digital forensic investigation. The large number of digital devices used to commit crimes or other related incidents, such as fraud and corruption, proved motivation for this module in order to investigate and combat these incidents successfully. The main topics covered, but not limited to, include: An introduction to Digital Forensics; Digital forensic processes; Hardware forensics; Digital forensics tools (software forensics); Forensic readiness; A digital forensics laboratory/facility; Network forensics; Live forensics; Professionalism and ethics in digital forensics; Cyber forensics; Cyber law. Students will be challenged to contribute innovative research ideas in the field of Digital Forensics by completing a number of mini projects such as writing research papers and writing software programs.

### **COS 784 Computer networks 784**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module covers computer networking principles and the operation of the TCP/IP protocol suite. The module includes studying the operation of relevant protocols, administration of network services, troubleshooting, as well as network design issues and challenges. Prior knowledge is assumed on basic data communications principles, the ISO OSI reference model, and the basic operation of protocols in the TCP/IP protocol

suite.

**COS 785 Computer graphics 785**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module is intended as an advanced module in real-time computer graphics and shader programming. The module includes the following topics: Advanced texture mapping, curves and curved surfaces, shadow mapping, skeletal animation, particle systems, ray tracing and collision detection. The module assumes prior knowledge of introductory graphics as presented in an undergraduate module and a working knowledge of linear algebra and calculus.

**COS 786 Parallel and distributed computing 786**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

Computational science relies on the analysis of often complex models, for its empirical data and analyses typically involve an enormous amount of calculations. Parallel computing is one means of reducing the time needed to complete such calculations. This module will examine the kinds of problems that lend themselves to parallel computation and the methods for implementing programs to solve such problems. The aim of the module is to provide a background for parallel and distributed computing as well as practical knowledge of the implementation of computational experiments.

**COS 787 Spatial databases 787**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module covers the major themes of spatial databases with application to geographic information systems (GIS), i.e. systems concerning data with an implicit or explicit reference to a location relative to the earth. Topics covered include an introduction to spatial databases and spatial data management systems, representation of geographic data, spatial data modelling, computational geometry, spatial data indexing, query processing and spatial data standards. For Computer Science students the module is an introduction to the ever increasing application field of geographics information systems (GIS), and for Geoinformatics students the module provides insight into the Computer Science foundations of the field.

**COS 788 Information hiding 788**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

Information hiding is a category of computer security that focuses on embedding information in digital objects. Information, such as digital signatures, are sometimes embedded in objects to indicate ownership or origin – a technology that is called watermarking. Alternatively information is sometimes hidden in digital objects to facilitate invisible or inaudible communication – called steganography. Steganography focuses on the confidentiality of information, while watermarking is used to protect intellectual property. This module covers the techniques and algorithms used in both technologies to embed information in objects with minimal perceptual and audible changes to the objects. The module also provides a brief overview of different multimedia formats, such as image, audio and video, in order to understand their potential and limitations in the field of information hiding. Potential attacks on information hiding systems are also investigated.

### **COS 790 Special topics (I) 790**

**Academic organisation:** Computer Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

From time to time, the department presents lectures on special topics within Computer Science. This module will be used to present such special topics.

### **COS 791 Special topics (II) 791**

**Academic organisation:** Computer Science

**Period of presentation:** Semester 1 or Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

From time to time, the department presents lectures on special topics within Computer Science. This module will be used to present such special topics.

### **IMY 110 Multimedia 110**

**Academic organisation:** Information Science

**Contact time:** 2 lpw 2 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 12

**Module content:**

\*Closed – requires departmental selection. Open to BIT, BSc:IT and BSc CS students. Mark-up Languages. This module explores the role of mark-up languages in the information environment; the difference between the logical structure and the appearance of documents; the study of HTML, CSS and XHTML; the building of websites and basic information architecture.

### **IMY 120 Multimedia 120**

**Academic organisation:** Information Science

**Prerequisite:** IMY 110

**Contact time:** 2 lpw 2 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 12

**Module content:**

\*Closed – requires departmental selection.

Multimedia for the Web. This module introduces the process of creating and editing images, animation, basic interactive content, and sound for the web using multimedia authoring tools, such as Adobe Photoshop, Adobe Flash (with basic ActionScript), and

Adobe Audition.

**IMY 210 Multimedia 210**

**Academic organisation:** Information Science

**Prerequisite:** IMY 110 or equivalent HTML knowledge

**Contact time:** 2 lpw 2 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 16

**Module content:**

\*Closed – requires departmental selection.

Advanced Markup Languages (1). This module investigates XML and its related technologies (such as XSLT, XPath, XSL-FO, DTD, XML Schema, and namespaces) as a vital part of the web development process.

**IMY 211 Multimedia 211**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 20

**Module content:**

\*Closed - requires departmental selection.

Multimedia and hypermedia theory. This module offers the opportunity to make a thorough study of the theory and applications of multimedia and hypermedia. This includes: multimedia products, multimedia authoring tools, hypermedia databases, digital publications on the World Wide Web, New Media, as well as information architecture, websites and the social realities and impact of the World Wide Web.

**IMY 220 Multimedia 220**

**Academic organisation:** Information Science

**Prerequisite:** IMY 210

**Contact time:** 2 lpw 2 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 16

**Module content:**

\*Closed - requires departmental selection.

Advanced Markup Languages 2 – This module assumes knowledge of dynamic scripts and basic web based technologies such as PHP as well as the use of relational databases like MySQL. The module explores the interplay between scripting languages, databases, and current industry standard web technologies, from both the server-side and client-side perspectives. The module has a focus on developing hands-on practical skills.

**IMY 300 Multimedia: Project 300**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 2 lpw

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 45

**Module content:**

\*Closed – requires departmental selection.

The module enables students to combine all their knowledge gained through out their

studies to create a functional game. The course consists of extensive game design theory teaching. The students create a game by following an iterative design process, extensive documentation and in depth play testing and usability testing. The final product is a creative, innovative and complete game.

**IMY 310 Multimedia 310**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed - requires departmental selection.

Human-computer Interaction. This module involves a study of human-computer interaction and human-information interaction; humans as computer and information users; and the ethical aspects relating to the creation of multimedia information products. A detailed study of the role, composition and functioning of an interface, underlying principles in the design and evaluation of interfaces, will also be undertaken.

**IMY 320 Multimedia 320**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed - requires departmental selection.

Trends. This module deals with technical aspects of multimedia hardware and software, digital video and audio formats and compression; and version management. A detailed study of the latest developments in mark-up languages and related technologies will also be undertaken.

**IMY 761 Applied multimedia 761**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed module

Development and production of a multimedia product; product life-cycle management and documentation; the student submits a proposal which is evaluated and if approved, produces a working multimedia product.

**IMY 771 Multimedia trends 771**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

History of multimedia ideas and technology; current trends in multimedia, latest technologies and future trends of multimedia.

**IMY 772 Hypermedia and mark-up languages 772**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

A study of hypermedia systems, specifically adaptive hypermedia systems, as well as data modelling, storage and retrieval, database structures and metadata. A study of different mark-up languages and their role in multimedia products with the emphasis on data structuring, hyper linking theories and models.

**IMY 773 Multimedia technology 773**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

In this module students will research and discuss a current topic which can change from year to year. The topic for a specific year can be obtained from the departmental website. The topic is related to the creative use of Multimedia Technologies. An understanding of the current multimedia trends is required together with the knowledge of its usage.

**IMY 774 Virtual environments 774**

**Academic organisation:** Information Science

**Contact time:** 1 lpw 1 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module exposes students to virtual environments, ranging from fully immersive virtual reality to online virtual worlds. Starting with the notion of reality and how it is simulated, students learn about hardware, software and human factors associated with the creation and exploration of virtual environments. Students are also exposed to VE platforms and techniques, which they use to create a virtual world.

**IMY 777 Animation theory and practice 777**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module provides an overview of the historic and current principles and practice of natural motion animation. Different animation techniques are covered, such as stop motion, traditional animation, and 3D animation. The student receives an opportunity to create an animated short film using a technique of their choice.

**IMY 779 Human-computer interaction 779**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

In this module, students are exposed to research topics and methodologies within the HCI discipline. Students then apply their understanding by proposing and delivering a research paper.

**IMY 890 Dissertation: Multimedia 890**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 180

**IMY 990 Thesis: Multimedia 990**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** Both Afr and Eng

**Credits:** 360

**INL 110 Information science 110**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 12

**Module content:**

This module is an introduction to the study field of information science and its various professions. Key concepts that will be discussed include the following: the human as information processor and user; the life-cycle of information in terms of processes, products and role-players; as well as the communication of information. The social-ethical impact of globalisation is included as a key concern, with reference to Africa.

**INL 120 Information science 120**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 12

**Module content:**

Organisation and representation of information. This module provides the student with an introduction to the basic principles and processes underlying the organisation and representation of information. The process of organising information in documents and on the web, in multimedia formats, by means of document image processing and in databases are dealt with. Themes on the representation of information through the creation of metadata include various general and domain specific metadata schemas such as Dublin Core as a metadata standard for the Web, as well as various other metadata schemas.

Practical classes include basic HTML and the design of Web pages incorporating and applying what was covered in theory.

**INL 130 Information science 130**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 12

**Module content:**

Personal information management. This module focuses on personal information management within an organisational context. It deals with managing information and knowledge that is peculiar to an individual and which enables him/her to perform his/her

job.

Topics include: creating an environment in which the individual can manage his/her information and knowledge; the skills needed to be able to manage personal information and knowledge; information overloading which gives rise to personal information and knowledge management, as well as the manner in which individuals can switch from personal information management to personal knowledge management; personal information and knowledge management as a career.

### **INL 133 Information science 133**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw Mamelodi

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module is an introduction to the study field of Information Science and its various professions. Key concepts that will be discussed include the following: the human as information processor and user; the life-cycle of information in terms of processes, products and role-players; information for development as well as the evolution of the information society.

### **INL 140 Information science 140**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 12

**Module content:**

Information and communication technology. This module offers a brief overview of hardware and software, telecommunications technology, LANs, WANs and intranets, the information highway, the internet and the World Wide Web, computer ethics, ICTs, e-commerce, mobile computing technology and the influence that new trends and developments have on the distribution of information.

### **INL 143 Information science 143**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw Mamelodi

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module discusses the communication of information. Key concepts that will be discussed include the following: the process of human communication; analyses of the communication process; levels of communications; dimensions of communication; functions of communication as well as the various contexts of communication.

### **INL 210 Information science 210**

**Academic organisation:** Information Science

**Prerequisite:** AIM 101 or AIM 111 and 121

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

Information seeking and retrieval. This module explores the theory and practice of effective information seeking and retrieval. It builds on supporting research paradigms

such as the systems, user-centred, cognitive and socio-cognitive paradigms. The focus is on the complexities of effective information seeking and retrieval within the context of information behaviour on a personal level, as well as in the context of professional, academic or everyday information needs.

### **INL 220 Information science 220**

**Academic organisation:** Information Science

**Prerequisite:** INL 210 or LP

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

Representation and organisation. Information needs to be represented and organised in a system for it to be effectively retrievable. This module deals with the representation and organisation of information on the level of individual entities (e.g. indexing), from the perspective of the users (user profiling), as well as within a document collection (taxonomies and ontologies).

### **INL 230 Information science 230**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

User studies and dissemination. This module focuses on the individual as seeker, user, reader and communicator of information. Various user groups are identified and their information use and communication patterns and requirements are analysed and investigated. This module covers methods of service provision to facilitate and enhance the use and dissemination of information in accordance with the user's needs.

### **INL 240 Information science 240**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

Social and ethical impact. This module examines moral and legal regulation practices related to information in print and digital environments. Different ethical theories are identified and applied to privacy, access to information, information poverty and censorship. The interpretation and enforcement of rules and regulations are discussed.

### **INL 260 Information science 260**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

Economics and politics of information. This module examines the economics and politics of information, with a special emphasis on South Africa's information sector. It aims to promote an understanding of the market and non-market qualities of information, and their consequences for the production, distribution and marketing of information goods and services. The ways in which information access and expression are regulated and the use of ICTs in crime and corruption is also addressed.

**INL 270 Information science 270**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 20

**Module content:**

Indigenous knowledge and communication. This module focuses on the role and function of Indigenous Knowledge (IK) in the information and knowledge society. Various categories and contexts of IK are explored within international and local perspectives. Issues pertaining to access and communication of IK, inter alia through Information and Communication Technology (ICT), are addressed in order to ensure sustainable development.

**INL 310 Information science: Information organisation 310**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 30

**Module content:**

Information Organisation. The module is concerned with the organisation of information in the digital environment focusing on the structure and use of document management and workflow systems, as well as distribution channels and virtual environments. The characteristics and application of the internet, intranets, as well as portals and applications use, are considered.

**INL 320 Information science: Information and knowledge management 320**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 30

**Module content:**

Information and Knowledge Management. This module focuses on information and knowledge management at an operational level and introduces information and knowledge management at a corporate strategic level. It deals with the management of information and knowledge, which enables the organisation to be competitive. In this module the focus is on four aspects, namely: the 21st century organisation, the external and internal stakeholders that have an interest in information products, as well as the infrastructure that should be in place in organisations to manage information products. The module concludes with a few topics relating to information management at a corporate strategic level.

**INL 340 Information science: Digital repositories 340**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 30

**Module content:**

This module deals with the construction and management of digital repositories. It also addresses the characteristics of the digital repository in a rapidly changing technological world and a challenging information society. Core aspects include: system design, relationships to hybrid libraries, digital collections and rights management, standards,

virtual referencing and the development and evaluation of digital repositories.

**INL 360 Information science: Socio-political aspects of information in global context 360**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 30

**Module content:**

This module examines aspects of the information and knowledge society within local, regional and international contexts. A special focus of the module is the interaction and exchange of data, information and knowledge from communities' local knowledge system with data, information and knowledge from the global knowledge system. The module discusses the growth and role of information and communication technologies (ICTs), and their implications for development.

**INL 370 Information science 370**

**Academic organisation:** Information Science

**Contact time:** 1 lpw 2 ppw

**Period of presentation:** Year

**Language of tuition:** Both Afr and Eng

**Credits:** 15

**Module content:**

Experiential learning project. This module takes the form of a project and experiential training in co-operation with industry.

**INL 380 Information science: Competitive intelligence 380**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 30

**Module content:**

This module provides an overview of Competitive Intelligence (CI) and focuses on the needs for CI in organisations. The ways in which organisations compete and the benefits that CI can bring to these organisations will also be covered. The growing need for CI among South African organisations will also be examined. Practical examples and case studies will be used to highlight the value of CI in organisations.

**INL 890 Dissertation: Information science 890**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 180

**INL 900 Examination: Information science 900**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** Both Afr and Eng

**Credits:** 360

**INY 711 Research methodology 711**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

Research methodology and the application thereof to resolve research problems and to create new knowledge, is a valued advantage to any student. The module is compiled with the following objectives in mind: to instruct the student in the basic principles of research and to avail them the opportunity to execute research projects in a professional manner. Students are guided from the selection of a problem to the presentation of a complete research report with practical suggestions based on a solid theoretical framework.

### **INY 713 Information and knowledge management (I) 713**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module consists of two main sections. A theoretical framework of information and knowledge management will be addressed in section one. Section two covers the enablers of information and knowledge management. These include: leadership, corporate culture, organisational learning, strategy, laws and policies, measurement and information technology.

### **INY 714 Organisation, retrieval and seeking of information 714**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

Information retrieval covers the problems relating to the effective storage, access, and searching of information required by individuals.

This module will introduce students to the theory and operative requirements of information organisation and retrieval and the evaluation of information retrieval systems, as well as information seeking behaviour.

### **INY 715 Information ethics 715**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on the main moral issues pertaining to information and ICT, globalisation, privacy and knowledge flow. It covers amongst others the following fields: cyber warfare and terrorism; information philosophy; information security; privacy and the right to information; digital identity management; cyber law; globalisation and the impact on society.

### **INY 716 Information and knowledge management (II) 716**

**Academic organisation:** Information Science

**Prerequisite:** INY 713

**Contact time:** 2 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module offers the student the opportunity to become conversant with various knowledge management programmes as well as the development, implementation and evaluation of knowledge management strategies. Knowledge representation and the development of an Intranet will be covered. New key issues in the field of knowledge management conclude this module.

**INY 717 Information retrieval 717**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

"Information is continuing to grow exponentially, diversifying into many forms and media. In this complex labyrinth there is a definite need for increased effort aimed at tailoring IR performance to user demands" (Ingwersen, 1992).

In this module students will study information retrieval from a systems perspective, but with the human user in mind. Best-match and Boolean systems will be studied in some detail, focussing on the different aspects of human and machine relevance. Information seeking behaviour studies that can support the enhancement of IR performance will also be covered.

**INY 722 Information society 722**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module evaluates approaches to and concepts of the information/knowledge society. It questions the origins and political motives for the promotion of an information/knowledge society, and examines a number of relevant themes in the literature.

**INY 726 Competitive intelligence (I) 726**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

Establishing an effective competitive intelligence programme is an integral part of every enterprise that wants to survive in the new millennium. This module focuses on the competitive nature of the business environment, the aim of competitive intelligence, Porter's Competitive Forces Model, the distinction between competitive intelligence and industrial espionage, the intelligence process as well as the tools and techniques for the development and implementation of a competitive intelligence programme.

**INY 727 Competitive intelligence (II) 727**

**Academic organisation:** Information Science

**Prerequisite:** INY 726

**Contact time:** 2 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

Competitive intelligence (CI) provides the decision maker with analysed information about the competitive environment, aimed at satisfying decision-making needs. This module focuses on the role of analysis in the intelligence cycle, applying analysis techniques to a case study, CI and corporate governance, the setting up of a CI capability in an organisation and the problems facing CI professionals in South Africa.

**INY 730 Information communication 730**

**Academic organisation:** Information Science

**Contact time:** 2 lpw

**Period of presentation:** See departmental website

**Language of tuition:** English

**Credits:** 15

**Module content:**

Informed by the participatory approach to communication this module reflects in depth on methods for the effective communication of information. In order to achieve this, the nature on information within the context on Information Science will be investigated. Thereafter, communication media will be identified and discussed and students will learn how to create a target audience profile to determine the appropriate media and content for the dissemination of information.

Information and communication technologies (ICTs) and the communication of information will be investigated along with literacy and media literacy. The communication of information will form a central focus of this module. Therefore the role of traditional, interpersonal, as well as modern media will be addressed. The processes of creating meaningful and effective messages for the communication of information as well as intercultural communication will also be addressed.

**INY 734 Research report 734**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed module

Students are expected to write a research report (5 000-7 000 words) (10 000-12 000 words) on a topic to be selected in collaboration with the lecturers.

**JCP 202 Community-based project 202**

**Academic organisation:** Informatics

**Contact time:** 1 opw

**Period of presentation:** Year

**Language of tuition:** Both Afr and Eng

**Credits:** 8

**Module content:**

This project-orientated module is a form of applied learning which is directed at specific community needs and is integrated into all undergraduate academic programmes offered by the Faculty of Engineering, Built Environment and Information Technology.

The main objectives with the module are as follows:

- (1) The execution of a community-related project aimed at achieving a beneficial impact on a chosen section of society, preferably but not exclusively, by engagement with a section of society which is different from the student's own background.
- (2) The development of an awareness of personal, social and cultural values, an attitude to be of service, and an understanding of social issues, for the purpose of being a responsible professional.
- (3) The development of important multidisciplinary and life skills, such as

communication, interpersonal and leadership skills.

Assessment in this module will include all or most of the following components: evaluation and approval of the project proposal, assessment of oral and/or written progress reports, peer assessment in the event of team projects, written report-back by those at which the project was aimed at, and final assessment on grounds of the submission of a portfolio and a written report.

**MIT 835 Information and knowledge management 835**

**Academic organisation:** Information Science

**Contact time:** 16 contact hours per semester

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**MIT 840 Mini-dissertation 840**

**Academic organisation:** School of Information Technology

**Prerequisite:** MIT 862

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 90

**MIT 841 Organisational behaviour and management 841**

**Academic organisation:** Information Science

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**MIT 842 Computer science in perspective 842**

**Academic organisation:** Computer Science

**Contact time:** 16 contact hours per semester

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 5

**MIT 843 Information in perspective 843**

**Academic organisation:** Information Science

**Contact time:** 16 contact hours per semester

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 5

**MIT 844 Strategic ICT management 844**

**Academic organisation:** Informatics

**Contact time:** 16 contact hours per semester

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**MIT 850 Life-cycle and maturity models for IT 850**

**Academic organisation:** Computer Science

**Contact time:** 16 contact hours per semester

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 8

**MIT 851 Digital economy 851**

**Academic organisation:** Informatics

**Contact time:** 16 contact hours per semester

<b>Period of presentation:</b> Semester 2 <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 852 ICT project management 852</b> <b>Academic organisation:</b> Informatics <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 2 <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 853 Corporate IT systems 853</b> <b>Academic organisation:</b> Computer Science <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 2 <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 860 ICT infrastructure management 860</b> <b>Academic organisation:</b> Computer Science <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 1 <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 862 IT research 862</b> <b>Academic organisation:</b> School of Information Technology <b>Prerequisite:</b> This module is a compulsory requirement for admission to MIT 840 <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 2 <b>Language of tuition:</b> English	<b>Credits:</b>
<b>MIT 863 Capita selecta 863</b> <b>Academic organisation:</b> Informatics <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 1 or Semester 2 <b>Language of tuition:</b> English	<b>Credits:</b> 12
<b>MIT 864 IT financial management 864</b> <b>Academic organisation:</b> Informatics <b>Contact time:</b> 16 contact hours per semester <b>Period of presentation:</b> Semester 1 <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 865 Web trends in library 865</b> <b>Academic organisation:</b> Information Science <b>Contact time:</b> 16 contact hours per year <b>Period of presentation:</b> Year <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 866 Digital repositories 866</b> <b>Academic organisation:</b> Information Science <b>Contact time:</b> 16 contact hours per year <b>Period of presentation:</b> Year <b>Language of tuition:</b> English	<b>Credits:</b> 8
<b>MIT 867 The knowledge society and international librarianship 867</b> <b>Academic organisation:</b> Information Science <b>Contact time:</b> 16 contact hours per year	

**Period of presentation:** Year  
**Language of tuition:** English **Credits:** 8

**MIT 868 Facilitating information retrieval and information use 868**  
**Academic organisation:** Information Science  
**Contact time:** 16 contact hours per year  
**Period of presentation:** Year  
**Language of tuition:** English **Credits:** 8

**MIT 869 IT systems in libraries 869**  
**Academic organisation:** Information Science  
**Contact time:** 16 contact hours per year  
**Period of presentation:** Year  
**Language of tuition:** English **Credits:** 8

**MIT 872 Knowledge management 872**  
**Academic organisation:** Information Science  
**Contact time:** 16 contact hours per year  
**Period of presentation:** Year  
**Language of tuition:** English **Credits:** 8

**MIT 873 Network technologies 873**  
**Academic organisation:** Information Science  
**Contact time:** 8 contact hours per semester  
**Period of presentation:** Semester 1  
**Language of tuition:** English **Credits:** 6

**MIT 874 Computer science in perspective 874**  
**Academic organisation:** Information Science  
**Contact time:** 8 contact hours per semester  
**Period of presentation:** Semester 1  
**Language of tuition:** English **Credits:** 6

**MIT 875 Organisational behaviour and leadership 875**  
**Academic organisation:** Information Science  
**Contact time:** 8 contact hours per semester  
**Period of presentation:** Semester 1  
**Language of tuition:** English **Credits:** 6

**MIT 876 Strategic ICT management 876**  
**Academic organisation:** Informatics  
**Contact time:** 8 contact hours per semester  
**Period of presentation:** Semester 1  
**Language of tuition:** English **Credits:** 5

**MIT 877 ICT project management 877**  
**Academic organisation:** Information Science  
**Contact time:** 8 contact hours per semester  
**Period of presentation:** Semester 2  
**Language of tuition:** English **Credits:** 5

**MIT 878 IT financial management 878**  
**Academic organisation:** Informatics  
**Contact time:** 8 contact hours per semester

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 6

**OKT 895 Mini-dissertation: Development communication 895**

**Academic organisation:** Information Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 90

**Module content:**

A report (80-100 pages) on an approved research project. Coursework.

**PUB 120 Publishing 120**

**Academic organisation:** Information Science

**Contact time:** 1 ppw 3 lpw

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 12

**Module content:**

\*Closed - requires departmental selection.

The Book Publishing Environment. This module provides a basic introduction to the book publishing environment. The following aspects are highlighted: the concept "publishing"; different publishing industries and environments; contexts of book publishing; the publishing value chain; processes, tasks and role-players involved in book publishing; different sectors of the book publishing industry; different types of publishing houses; external role-players; initiatives; strategies; current trends and issues.

**PUB 210 Publishing 210**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Both Afr and Eng

**Credits:** 20

**Module content:**

\*Closed - requires departmental selection.

Copy-editing. This module offers an introduction to copy-editing as a phase in the publishing process. Topics covered are the role of the copy-editor in the publishing value chain; the levels of editing; the responsibilities of the copy-editor towards the manuscript, the author and the publishing house; the responsibilities and skills of the proof-reader; typical problems in texts; proof-reading and copy-editing symbols and the mark-up of texts; as well as legal and ethical aspects of editing. Learners are also equipped with practical skills in proofreading and copy-editing both digital and print-based texts.

**PUB 220 Publishing 220**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 20

**Module content:**

\*Closed - requires departmental selection.

The Visual and Production Dimensions of Publishing. This module offers a theoretical positioning of graphic design, reproduction and printing within the publishing process, as well as practical applications thereof. The following topics are addressed in the theoretical positioning: graphic design practice; the historical development of the relationship between reproduction and printing innovations and graphic design styles; the use of visual elements in publications; the management role of the editor in this phase.

During the practical component learners are introduced to selected applications of DTP software and the practical aspects of the production phase.

### **PUB 310 Publishing 310**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed - requires departmental selection.

Publishing in the Digital Environment. The first part of this module focuses on the study of publications in the digital environment. Differences between paper-based and digital texts are studied. Publication formats in the digital arena are discussed by focusing on topics such as multimedia, hyper fiction, e-books, etc., as well as distribution channels such as intranets and portals. The influence of the digital environment on publications and publication processes is the main focus of the second part, focusing on understanding the nature and management of the e-publishing environment and digital publishing technologies such as HTML, SGML, XML and PDF.

### **PUB 311 Publishing 311**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 30

**Module content:**

\*Closed - requires department selection.

Commissioning. This module offers an introduction to the commissioning phase of the book publishing process. The process of manuscript commissioning is studied within the dual contexts of the South African publishing environment and the internal environment of the publishing house.

Topics covered include: market research; list building; the management of both the manuscript development and production phases; costing a project; scheduling and contracts. Learners demonstrate their understanding of commissioning through case studies, role-plays and the creation of a manuscript proposal.

### **PUB 320 Publishing 320**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 20

**Module content:**

\*Closed – requires departmental selection.

Management in the Publishing Environment. This module offers an introduction to publishing as a business. Topics covered include business models in the publishing industry, the organisational structures of publishing houses, and the application of marketing in a publishing context.

### **PUB 321 Publishing 321**

**Academic organisation:** Information Science

**Contact time:** 3 lpw 3 ppw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 20

**Module content:**

\*Closed - requires department selection.

Publishing in the Magazine and Corporate Environment. This module offers an introduction to the publishing value chain as applied to magazines and corporate publications; the magazine and corporate publishing environment (including kinds of magazines and corporate publications, readership, market segmentation); commissioning writing for magazines and corporate publications; production processes; sales and marketing; and distribution.

**PUB 712 Advanced e-publishing 712**

**Academic organisation:** Information Science

**Contact time:** 3 dpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

The aim of this module is to further familiarise students with the development, economics and delivery of electronic publications. Students develop strong e-production skills through hands-on implementation of publication workflows for various electronic publications. Students also implement a business plan for the distribution and marketing of these publications.

**PUB 722 Publishing management: Management and finance 722**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on the theory and practice of publishing management. Issues addressed include the following: personal skills; general management skills; financial skills; new product development; costing; editorial issues.

**PUB 723 Publishing management: Organisation and processes 723**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module focuses on the theory and practice of publishing management. Issues addressed include the following: human resources; legal skills; project management; sales and marketing; communication skills; logistics; leadership.

**PUB 724 The publishing environment: Developments and trends in the South African book industry 724**

**Academic organisation:** Information Science

**Contact time:** 1 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 15

**Module content:**

This module is research-based. The focus is on developments and trends impacting on the value chain and supply chain of the local book industry.

The overall objective of the module is to generate research that can contribute to information on the shape and size of this cultural industry.

**PUB 725 The publishing environment: Global developments and trends in book publishing 725****Academic organisation:** Information Science**Contact time:** 1 lpw**Period of presentation:** Semester 2**Language of tuition:** English**Credits:** 15**Module content:**

This module is research-based. The focus is on global developments and trends impacting on book publishing as a cultural industry. The research parameters will be determined yearly by a selection of relevant global practices impacting on local developments and trends.

**PUB 728 Editorial practice: Advanced copy-editing and editorial project management 728****Academic organisation:** Information Science**Contact time:** 2 lpw**Period of presentation:** Semester 1 and Semester 2**Language of tuition:** English**Credits:** 15**Module content:**

One of the central role players in the publishing value chain is the copy-editor, whose tasks range from copy-editing and proofreading manuscripts, to developing budgets and schedules, and managing entire publishing projects through production. This module builds on students' knowledge of and skills in editorial practice, including advanced copyediting, editorial and production project management. The module also focuses on theory of editorial practice, including editorial approaches and policies.

**PUB 729 Editorial practice: List building and acquisition of rights 729****Academic organisation:** Information Science**Contact time:** 2 lpw**Period of presentation:** Semester 1 and Semester 2**Language of tuition:** English**Credits:** 15**Module content:**

At the heart of the publishing value chain lies the commissioning editor or publisher, whose tasks range from commissioning new titles and nurturing authors, through to managing entire publishing lists and making rights acquisitions. This module builds on students' knowledge of and skills in commissioning and acquisitions, with a particular focus on strategic and financial aspects of publishing list building, and acquisition policies and procedures.

**PUB 890 Dissertation: Publishing 890****Academic organisation:** Information Science**Period of presentation:** Year**Language of tuition:** English**Credits:** 180**Module content:**

A comprehensive report on an aspect of Publishing.

**PUB 990 Thesis: Publishing 990****Academic organisation:** Information Science**Period of presentation:** Year**Language of tuition:** Both Afr and Eng**Credits:** 360**Module content:**

A comprehensive and advanced report on an approved project. Expert, highly specialised

and interdisciplinary research within Publishing.

**RKW 890 Dissertation: Computer science 890**

**Academic organisation:** Computer Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 180

**RKW 990 Thesis: Computer science 990**

**Academic organisation:** Computer Science

**Period of presentation:** Year

**Language of tuition:** English

**Credits:** 360

**SIT 133 Information technology orientation 1 133**

**Academic organisation:** Computer Science

**Prerequisite:** BSC: IT and BIS Multimedia four year programme only (12131008 and 12133212)

**Contact time:** 1 ppw 2 dpw 2 lpw Mamelodi Foundation module

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module provides academic support and development within the context of Information Technology. The module will help guide students with regards to communication skills, study methodologies and values. Students will specifically be exposed to different study methods in order for them to develop their own, critical thinking, time management and prioritisation, taking of notes, and the use of references and the citation thereof. Additionally, the module will expose students to Information Technology and its influences.

**SIT 143 Information technology orientation 2 143**

**Academic organisation:** Computer Science

**Prerequisite:** SIT 133

**Contact time:** 1 ppw 2 dpw 2 lpw Mamelodi Foundation module

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 8

**Module content:**

Continuation of the SIT 133 module.

**SIT 153 Introduction to computing 153**

**Academic organisation:** Computer Science

**Prerequisite:** SIT 143

**Contact time:** 1 ppw 2 dpw 2 lpw Foundation module

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**

This module introduces concepts and terminology related to computing. Topics covered include the history of computing, machine level data representation, Boolean logic and gates, basic computer systems organisation and algorithms. The module also introduces some of the subdisciplines of computing, such as computer networks, information management, information security and intelligent systems.

**SIT 700 Industry-based learning 700**

**Academic organisation:** School of Information Technology

**Period of presentation:** Semester 2

**Language of tuition:** Both Afr and Eng

**Credits:** 52

**SIT 990 Thesis: Information technology 990**

**Academic organisation:** School of Information Technology

**Period of presentation:** Year

**Language of tuition:** Both Afr and Eng

**Credits:** 360