

COMMISSION FOR HIGHER EDUCATION

**Credit Accumulation and Transfer System
Information Technology
Undergraduate**

Assuring Quality Higher Education

September 2010



Commission for Higher Education

Credit Accumulation and Transfer System Information Technology Undergraduate

September 2010



CREDIT ACCUMULATION AND TRANSFER SYSTEM
INFORMATION TECHNOLOGY
UNDERGRADUATE

Commission for Higher Education
Nairobi, Kenya, September 2010

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Commission for Higher Education (CHE)
P O Box 54999 - 00200
NAIROBI, KENYA.

Tel. No. +254 - 20- 7205000, +254 - 20 - 2021151, Fax No. + 254 - 20 - 2021172
Web site: www.che.or.ke



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FOREWORD

In the last twenty years, Kenya has witnessed rapid expansion of university education as a result of establishment of new public and private universities. Consequently, universities developed many academic programmes with some having similar contents, but taught under different names. Overtime this scenario brought challenges. Employers started to question the names and similarities associated with some programmes and secondly students could not transfer credits in the related programmes from one institution to another. This problem is common to all member states of the East African Common market.

To address this problem, the Higher education regulatory bodies of East African community member states, namely Commission for Higher Education (CHE) Kenya, National Council for Higher Education (NCHE) Uganda and Tanzania Commission for Universities (TCU) started the Credit Accumulation and Transfer System (CATS) project. The project was funded by Rockefeller Foundation. During this phase of the project, minimum core requirements in Human Medicine, Engineering, Basic Sciences and Agriculture were developed. After this phase it was decided that each country proceeds with the project by developing minimum core requirements in other fields of study in higher education.

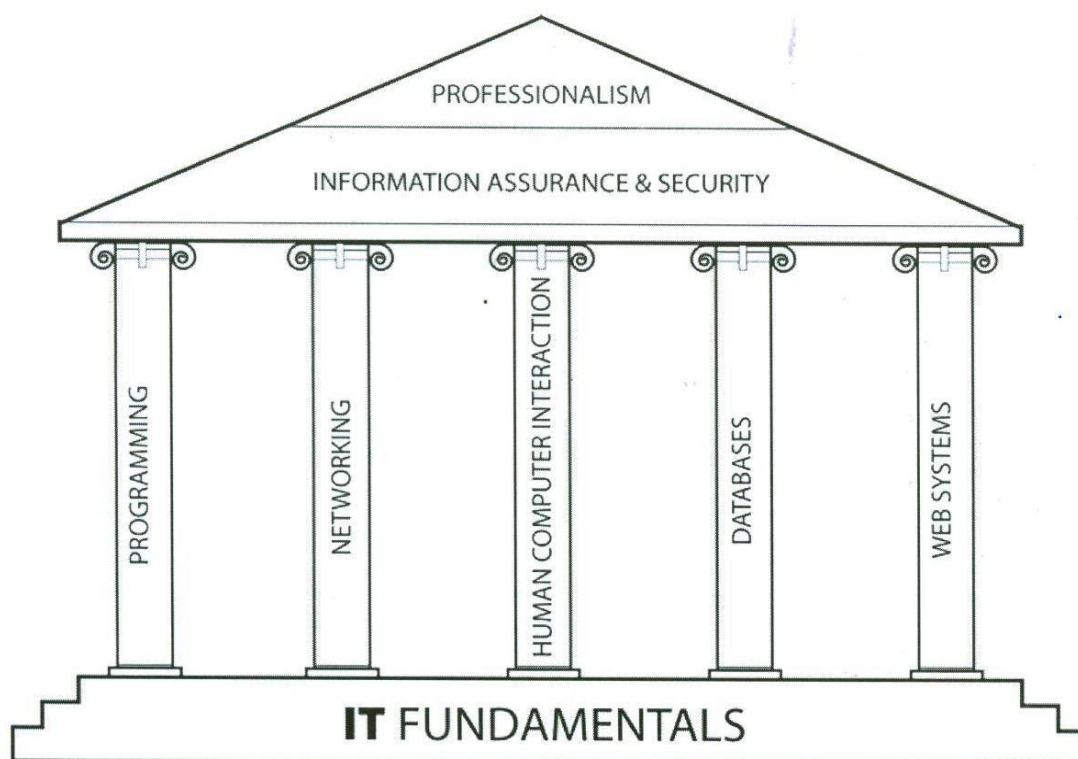
Phase two of the project comprised the development of core requirements in the field of Business Studies and Information Technology/ Computer Science. Experts from the universities that offer these fields were invited by the Commission to develop the minimum core requirements. Universities offering these fields are expected to implement them and to provide feedback to the Commission for further refinements. The Commission is committed to the CATS project in the development of minimum core requirements in the various fields of study offered by higher education institutions in the country. The objective of the CATS project is to regulate the mobility of students within institutions and ensure programme integration and harmonization of the higher education landscape in Kenya and to serve as input into the National Qualifications Framework. The success of the CATS project in Kenya is dependent on the cooperation between the Universities offering the fields of study and the Commission for Higher Education for coordination.

Prof. Everett M Standa, MBS
Commission Secretary/CEO
Commission for Higher Education
Nairobi, Kenya

INTRODUCTION

Information Technology (IT) in its broadest sense encompasses all aspects of computing technology. IT, as an academic discipline, is concerned with issues related to **advocating for users** and meeting their needs within an organizational and societal context through the **selection, creation, application, integration and administration** of computing technologies

As a guide in developing the respective courses the pillar below for Information Technology as provided by ACM/IEEE 2008 IT recommendations provides the insights behind the programme. Each of the main knowledge areas have been sub-divided into several course emphasising the importance of the pillar in defining the discipline.



3.0 PROJECT TEAM MEMBERS

Professor Daniel Rotich, - Moi University

Dr Joseph Sevilla, - Strathmore University

Dr Waweru Mwangi, - Jomo Kenyatta University of Agriculture and Technology

Mr Emmanuel Kweyu, - Strathmore University

Mr John Konyino, - Maseno University

Mr Humphrey Kilwake, - Masinde Muliro University of Science and Technology

Mr Kennedy Waweru, - St. Pauls' University

4.0 ADMISSION REQUIREMENTS

A candidate must satisfy any of the following minimum requirements:

- a) Be a holder of KCSE (or equivalent examination) certificate with a minimum aggregate of C+ and a minimum of C+ in both Mathematics and English; or
- b) Be a holder of KACE certificate with a minimum of two principal passes and one subsidiary pass at A-level, whereby one principal pass is either in
 - i. Mathematics; or
 - ii. Physics with credit pass in Mathematics at O-level; or
- c) Be a holder of Validated Diploma in Information Technology with at least a credit pass or related work experience.

5.0 CREDIT TRANSFER

Credits are transferable within 5 years of obtaining the results. A student registered in one university must have taken at least 51% of the courses at this university to obtain a degree from the same. The remaining 49% can be courses transferred from other universities. Students must complete all the pre-requisite courses prior to credit transfer.

To qualify for credit transfer a student must have obtained at least a grade of C in the given course.

TABLE 1: GRADING SYSTEM

Marks Range	Cluster/grade	GPA
69.5% and above	A	4.00
59.5%-69.4%	B	3.00
49.5%-59.4%	C	2.00
40%-49.4%	D	1.00
Below 40 %	Fail	0.00

6.0 Overall Goal of Programme

The Information Technology programme aims at providing IT graduates with the skills and knowledge to take on appropriate professional positions in Information Technology upon graduation and grow into leadership positions or pursue research or graduate studies in the field.

76.0 Programme Learning Outcomes

On successful completion of the course, graduates should be able to:

1. Apply knowledge of computing and mathematics appropriate to the discipline;
2. Analyze problems, and provide solutions to IT based problems;
3. Effectively communicate information, ideas, problems and IT-based solutions;
4. Demonstrate professionalism, ethics, legal, security and social responsibilities as well as best practices and standards and their application in Information Technology fields.
5. Analyze the local and global impact of computing on individuals, organizations, and society; and
6. Apply current technical concepts and practices in the core information technologies to solve IT problems.

8.0 PROGRAMME LEARNING OUTCOMES AGAINST COURSES PER YEAR

Various courses, which are distributed in a progressive manner in the various years of study, contribute to the realization of the programme learning outcomes as summarized in Table 2.

TABLE 2: PROGRAMME LEARNING OUTCOMES AGAINST COURSES PER YEAR

PROGRAMME LEARNING OUTCOMES	COURSE PER YEAR			
	YEAR 1 Course	YEAR 2 Course	YEAR 3 Course	YEAR 4 Course
1. An ability to apply knowledge of computing and mathematics appropriate to the discipline	<ul style="list-style-type: none"> • Information Technology Fundamentals • Discrete structures for IT • Probability and statistics • Mathematics for IT • Platform technologies I • Fundamentals of Programming 	<ul style="list-style-type: none"> • Research Methods and Technical Writing • Networking 		
2. Analyze problems, and provide solutions to IT based problems.	<ul style="list-style-type: none"> • Fundamentals of Programming • Data Structures and Algorithms • Object-Oriented Programming I 	<ul style="list-style-type: none"> • Object-Oriented Programming II • Introduction to databases • Platform technologies II • Event Driven Programming • Web systems and Technologies I • Networking Administration and Management 	<ul style="list-style-type: none"> • System administration and management • Human Computer Interaction • Integrative programming and technologies • Software Engineering 	<ul style="list-style-type: none"> • Software Project Management • IT project

3. Effectively communicate information, ideas, problems and IT-based solutions.		<ul style="list-style-type: none"> • Systems Analysis and design 	<ul style="list-style-type: none"> • Information management • Software Engineering • Industrial attachment 	<ul style="list-style-type: none"> • IT project
4. Demonstrate professionalism, ethics, legal, security and social responsibilities as well as best practices and standards and their application in Information Technology fields.		<ul style="list-style-type: none"> • Systems Analysis and design 	<ul style="list-style-type: none"> • Information Assurance and Security I • Information Assurance and Security II 	<ul style="list-style-type: none"> • Social and Professional Issues • IT and Society • IT project • Entrepreneurship
5. Analyze the local and global impact of computing on individuals, organizations, and society.	<ul style="list-style-type: none"> • Platform technologies I 	<ul style="list-style-type: none"> • Platform technologies II 	<ul style="list-style-type: none"> • Wireless and Mobile Computing 	<ul style="list-style-type: none"> • Management information systems • E-commerce • IT project
6. Apply current technical concepts and practices in the core information technologies to solve IT problems.		<ul style="list-style-type: none"> • Platform technologies II • Networking Administration and Management 	<ul style="list-style-type: none"> • Wireless and Mobile Computing • Web systems and Technologies II • Industrial attachment 	<ul style="list-style-type: none"> • IT project

9.0 PROGRAMME STRUCTURE

The minimum number of credit units required to complete the programme is 174 credit units, which is equivalent to 2436 lecture hours. However, for one to obtain a Bachelor of Science degree in Information Technology, he/she must have taken 108 compulsory credit units, which is equivalent to 1512 lecture hours, as provided in this curriculum. The remaining units are left to the discretion of the Institution offering the programme.

1 credit unit (CU) is equivalent to:

- a) 14 lecture hours;
- b) 28 hours of tutorials; or
- c) 42 hours of Practicals.

10.0 core programme courses

The core courses for the Bachelor of Science in Computer Science degree are summarized per year in Table 3.

TABLE 3: CORE COURSES FOR THE PROGRAMME

Year One	COURSES	Credit Units
YEAR ONE		
	Information Technology Fundamentals	3
	Discrete structures for IT	3
	Fundamentals of Programming	3
	Probability and statistics	3
	Data Structures and Algorithms	3
	Object-Oriented Programming I	3
	Platform technologies I	3
	Object-Oriented Programming II	3
	Mathematic for IT	
YEAR TWO		
	Introduction to databases	3
	Platform technologies II	3
	Networking	3
	Systems Analysis and design	3
	Event Driven Programming	3
	Web systems and Technologies I	3
	Networking Administration and Management	3
	Research Methods and Technical Writing	3
YEAR THREE		
	Human Computer Interaction	3
	Wireless and Mobile Computing	3

	Web systems and Technologies II	3
	Information Assurance and Security I	3
	Information Assurance and Security II	3
	Information management	3
	Integrative programming and technologies	3
	System administration and management	3
	Software Engineering	3
	Industrial attachment	6
YEAR FOUR		
	Software Project Management	3
	Entrepreneurship	3
	IT project	6
	Management information systems	3
	E-commerce	3
	Social and Professional Issues	3
	IT and Society	3

11.0 Course descriptions

	INFORMATION TECHNOLOGY FUNDAMENTALS
Credit units	3
Pre-requisite	None
Purpose of the Course	To introduce students to various parts of the computer, their applications to computing and the underlying theories and concepts, history and basic data communication of a computer
Expected Learning Outcomes	<p>At the end of the course, the students should be able to:</p> <ol style="list-style-type: none"> 1. Explain the basic principles of computer communication through number systems, data representations and computer networks; 2. Discuss the evolution of computers, its different parts and integration; 3. Write and simulate algorithms; 4. Draw and analyse flowcharts; 5. Assemble and disassemble computers parts; 6. Troubleshoot basic computer problems; and 7. Install operating system.

Content	History and classification of computers, different number systems, memory and storage, input/output peripherals discussion and familiarizations, algorithms, flow charting, introduce different programming languages; Operating System installation, basic computer troubleshooting, assembly and disassembly, basic networking theories and concepts, introduction to the Internet.			
Learning and Teaching Methodologies	PC assembly and troubleshooting demonstrations, lectures using powerpoint, assignments, exams and recitations			
Course Assessment	Type			Weighting (%)
	Examination			60
	Continuous Assessment			40
	Total			100
Recommended Reading	TITLE	AUTHOR	PUBLISHER	ISBN
	Data Processing and information technology 10th Ed	C. S. French	DP Publications	185805-171-1
	Computers and information systems 2nd ed,	T. J. O'Leary,	Benjamin/Cummings,	0-8053-6942-2
	A Balanced Introduction to Computer Science	David Reed	Prentice Hall. 2004	013046709X
	Fundamentals of computing	Rowntree, G.	Manchester NCC publications	0-85012-661-4
Support Materials and Resources	1. Texts, audio and video cassettes, computer software 2. Other resources: 3. http://www.daileyint.com/hmdpc/manual.htm 4. http://www.internet4classrooms.com/support.htm 5. http://www.pcguides.com/ts/index.htm			

Course Name	DISCRETE STRUCTURES	
Credit units	3	
Pre-requisite	Mathematical preparation sufficient to take calculus at the college/ university level	
Purpose of the Course	The course introduces to students the foundations of discrete mathematics as they apply to information technology and aims at highlighting applications whose solutions require proof, logic and counting.	
Expected Learning Outcomes	<p>At the end of the course students will be able to:</p> <ol style="list-style-type: none"> 1. Design simple logic circuits; 2. Describe digital logic elements; 3. Explain fundamental structures of Information Technology; 4. Compute basic Boolean algebra; 5. Describe Propositional logic, basic counting, and elementary number theory. 	
Course Content	<p>Introduction to logic and proofs: Direct proofs; proof by contradiction; mathematical induction. Fundamental structures: Functions (surjections, injections, inverses, composition); relations (reflexivity, symmetry, transitivity, equivalence relations); sets (Venn diagrams, complements, Cartesian products, power sets); pigeonhole principle; cardinality and countability. Boolean algebra: Boolean values; standard operations on Boolean values; de Morgan's laws. Propositional logic: Logical connectives; truth tables; normal forms (conjunctive and disjunctive); validity. Digital logic: Logic gates, flip-flops, counters; circuit minimization. Elementary number theory: Factorability; properties of primes; greatest common divisors and least common multiples; Euclid's algorithm; modular arithmetic; the Chinese Remainder Theorem. Basics of counting: Counting arguments; pigeonhole principle; permutations and combinations; binomial coefficients.</p>	
Mode of delivery	Lectures, tutorials, and seminars.	
Instructional Material and/or Equipment	Computers, Learning Management System, Writing boards, writing materials, projectors	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Course Assessment	Assignments, tutorials, tests, practical exercises and written examinations.	

Core Reading Material for the course	<ol style="list-style-type: none"> 1. Molluzzo and Buckley - A First Course in Discrete Mathematics, Any publisher or Coursepak. 2. L. Lovasz, J. Pelikan, K. Vestergombi - "Discrete Mathematics", Springer 2003
Recommended reference material	<ol style="list-style-type: none"> 1. Stanat and McAllister - Discrete Mathematics in Computer Science. 2. Schaum's Discrete Mathematics 3. Cormen, Leiserson, and Rivest - Algorithms

Course Name	FUNDAMENTALS OF PROGRAMMING
Credit units	3
Pre-requisite	Information Technology Fundamentals
Purpose of the Course	To enhance an understanding of fundamental concepts underlying programming and problem solving.
Expected Learning Outcomes	<p>At the end of the course the students will be able to:</p> <ol style="list-style-type: none"> 1. Discuss fundamental issues in programming; 2. Write, compile, and run simple programs on a computer; 3. Write programs involving sequence, selection, and iteration operators; 4. Create algorithms for solving simple problems; 5. Use a structured programming language to implement, test, and debug algorithms for solving simple problems.
Course Content	History and overview of programming languages, overview of programming paradigm, , Structured programming: problem solving techniques, algorithms, pseudo code, Basic syntax and semantics of a higher-level language, data types, expressions, statements, input/output, control structures, data structures. Basic sequencing, alternation, and looping control constructs. Subprograms: functional and procedural abstractions and data abstraction, files; Introduction to programming can be done using either C or Pascal (Modula-2, Ada, Python are also possibilities).
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.

Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	<ol style="list-style-type: none"> 1. Kochan S. C. (2001). <i>Programming in C</i> Delhi : CBS Publishers & Distributors 2. Deitel & Associates. (2005) <i>C++: How to program</i>, 5th Ed. New Delhi : Prentice - Hall, ISBN 0-13-185757-6 3. Springer G. & Friedman D. P. (1989) <i>Scheme and the art of programming</i>, Boston : McGraw-Hill Book Company, ISBN 0-26-219288-8 4. Neibauer A.R. (1994) <i>Your first C/C++ program</i>. New Delhi : BPB Publications, ISBN 81-7029-371-5 	

Course Name	PROBABILITY AND STATISTICS
Credit units	3
Pre-requisite	Discrete Structures for IT
Purpose of the Course	This course is an introduction to probability and statistics. Students will be introduced to organizing data, descriptive statistics, and inferential statistics while incorporating problem solving and critical thinking skills to real life situations
Expected Learning Outcomes	<p>At the end of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Interpret and construct statistical charts and tables; 2. Perform a wide variety of probability calculations and derivations to solve problems using probability; 3. Communicate the results of statistical analyses graphically and verbally; 4. Accurately compute numerical summaries used to describe the central tendency, spread and shape in the distribution of numerical data sets; 5. Apply correlations, regressions and hypothesis testing to statistical problems.

Course Content	Introduction to statistics and statistical thinking; fundamental elements of statistical analysis; introduction to the use of computers in statistical analysis; describing and exploring data: distributions of data, measures of location, measures of variation, basic elements of probability; random variables; moments and moment generating functions, linear combination of random variables; Bernouli trials and the binomial distribution, the geometric and negative binomial distributions; sampling without replacement; the Poisson distribution; the normal distribution; the central limit theorem; confidence intervals and sample sizes. Basic concepts of inference, correlation, regression and hypothesis testing.	
Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	<ol style="list-style-type: none"> 1. Elementary Statistics, 7th Edition, Mario F Triola, Addison-Wesley, ISBN: 0201775700 2. Basic Business Statistics and Student CD-ROM, Berenson David M. Levine Timothy C. Krehbiel, Prentice Hall (2003), ISBN: 0131037919 3. Mathematical Statistics 5th Edition, John E Freund & Ronald E Walpole,, Prentice Hall, 0135638348. 4. Introduction to Mathematical Statistics, Hogg R. and Craig C., Prentice Hall, ISBN: 0023557222 5. Probability and Statistics Third Ed.,, De Groot,, Pearson Addison, Wesley, ISBN: 0-201524880 	

Course Name	DATA STRUCTURES AND ALGORITHMS
Credit units	3
Pre-requisite	Discrete Structures for IT
Purpose of the Course	This course unit is designed to focus on implementation and mathematical analysis of fundamental data structures and algorithms.

Expected Learning Outcomes	<p>At the end of the course the students will be able to:</p> <ol style="list-style-type: none"> 1. Describe the representation of numeric and character data; 2. Discuss the use of primitive data types and built-in data structures; 3. Describe common applications for each data structure in the topic list; 4. Implement the user-defined data structures in a high-level language; 5. Compare alternative implementations of data structures with respect to performance; 6. Write programs that use each of the following data structures: arrays, strings, linked lists, stacks, queues, hash tables, trees and graphs; 7. Compare and contrast the costs and benefits of dynamic and static data structure implementations. 	
Course Content	<p>Representation of numeric data; Range, precision, and rounding errors; Arrays; Representation of character data; Strings and string processing; Runtime storage management; Pointers and references; Linked structures; Implementation strategies for stacks, queues, and hash tables; Implementation strategies for graphs and trees; Strategies for choosing the right data structure. Recursion: Recursive mathematical functions, Simple recursive functions. Introduction to algorithm analysis. Non Linear Structures: Trees; Binary Trees, Binary Search Trees, Binary Heaps. Abstract Data Types: stacks, queues, lists, Priority Queues. Introduction to Graphs. Introduction to: Huffman codes, Heapsort, TreeSort, Linear Search, Binary Search</p>	
Mode of delivery	Lectures , directed reading, Group/class discussions and practical exercises	
Instructional Material and/or Equipment	Audi visual equipment, Computers, writing boards, writing materials, projectors etc	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Core Reading Material for the course	1. Cormen, Leiserson, and Rivest - Algorithms	
Recommended reference material	1. Anany Levitin - Introduction to The Design and Analysis of Algorithms	

Course Name	PLATFORM TECHNOLOGIES 1	
Credit units	3	
Pre-requisite	Fundamentals of computing	
Purpose of the Course	To enhance students' understanding of important concepts and algorithms in operating systems	
Expected Learning Outcomes	<p>At the end of the course the students will be able to:</p> <ol style="list-style-type: none"> 1. To construct IT software using appropriate operating system environments and system tools; 2. Elaborate the key concepts of modern operating systems; 3. Gauge system performance tuning and system administration; 4. Enforce suitable synchronization in designing multithreaded applications. 	
Course Content	<p>OS architecture: kernel, libraries, drivers, processes, daemons/ services, GUI; Fundamental issues in design: processes, threads and memory management, process and thread co-ordination and synchronization (mutexes, barriers...), inter-process communication (signals, pipes, messages, events, etc.), real-time clock management. Multithread programming: Concurrent processing, mutual exclusion, deadlocks. I/O device drivers, file systems, and frame stage network communication. Features of UNIX or LINUX. Principles of distributed operating systems including networking protocols, distributed file systems, remote IPC mechanisms, graphical user interfaces, load balancing and process migration. Lab session will focus on Threads, Signals, Pipes, Inter-process communication; programming tools.</p>	
Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audio visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Core and reference material	<ol style="list-style-type: none"> 1. Operating System Concepts, Fifth Edition (1997), A. Silberschatz and P. Galvin, (Addison-Wesley), ISBN: 0130313580 2. Modern Operating Systems, Andrew S Tannenbaum, Prentice Hall, ISBN: 0-13-031358-0 3. Operating Systems, William Stallings, Prentice-Hall 2001, 4. Operating Systems: A modern perspective, Gary Nutt, Addison Wesley, (2000)
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Course Name	MATHEMATICS FOR IT	
Credit units	3	
Pre-requisite	None	
Purpose of the Course	To enhance an understanding of Mathematical concepts underlying current developments in IT Modeling.	
Expected Learning Outcomes	<p>At the end of the course the students will be able to:</p> <ol style="list-style-type: none"> 1. Explain the importance of a range of mathematical concepts, including sets, relations, functions, basic logic, and graphs and trees for IT; 2. Explain the role of mathematics in IT; 3. Demonstrate different traversal methods for trees and graphs; and 4. Model problems in IT using graphs and trees. 	
Course Content	Sets, relations, functions, basic logic, graphs, Trees, Undirected graphs, Directed graphs, Spanning trees, Traversal strategies, Functions, Calculus: differentiation, rules of differentiation, integration; definite and indefinite integrals, rules of integration, role of mathematics in IT	
Mode of delivery	Lectures, directed reading and practices with given problems.	
Instructional Material and/or Equipment	Audio visual equipment, whiteboard.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Core Reading Material for the course	TITLE	AUTHOR	PUBLISHER	ISBN
	Introduction to Mathematical Statistics and its applications	Larsen R. And Marx M.	4 th Edition 2006 Upper Saddle River, NJ Pearson Practice Hall	0-13-186793-8
Recommended reference material	Thinking mathematically 4 th edition. Blitzer R. 2008. Englewood Cliffs. NJ Prentice Hall. ISBN 0131752049			

Course Name	OBJECT ORIENTED PROGRAMMING 1
Credit units	3
Pre-requisite	Introduction to Computer Programming
Purpose of the Course	To introduce students to the fundamental concepts underlying Object Oriented programming paradigm
Expected Learning Outcomes	At the end of the course the students will be able to: <ol style="list-style-type: none"> 1. Discuss object technology and its applications; 2. Explain the main principles of good OO design; 3. Design well-structured algorithms and develop programs in an object oriented language using abstract data types; 4. Explain the application of a variety of data structures; 5. Compare and contrast data structures; 6. Apply object oriented programming concepts including inheritance, polymorphism and operators.
Course Content	In this course, students will be introduced to general principles underlying the practice of object-oriented programming (using preferably C++ or Java). Topics include introduction to OOP; primitive data types; variables, constants, operands and operators;; Input/output; Floating point input; control structures; logical; file I/O; arrays: one-dimensional, two-dimensional; Separation of behavior and implementation; Objects, classes and subclasses; compound types; control loops; pointers; function; abstraction; Encapsulation and information-hiding; inheritance(overriding, dynamic dispatch); Multiple inheritance; Polymorphism; (subtype polymorphism vs. inheritance), virtual function.
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.

Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	<ol style="list-style-type: none"> 1. Deitel, H. M. (2003) <i>C++: How to Program</i>, 5th Ed. Upper Saddle River, N.J : Prentice Hall, ISBN 0-13-185757-6. 2. D'Orazio T. B. (1999) <i>Programming in C++</i>. New York : WCR/McGraw-Hill, ISBN 0-07-242412-5 3. Lafore R. (2002) <i>Object oriented programming in C++</i>. Techmedia : New Delhi, ISBN 81-7635-608-5 4. Neibauer A. R. (1994) <i>Your first C/C++ program</i>. New Delhi : BPB Publications, ISBN 81-7029-371-5 5. Guzdial M. (2005) <i>Object-Oriented Design with Multimedia Applications</i>. Upper Saddle River N.J: Prentice Hall, ISBN 0-13-028028-3 	

Course Name	OBJECT ORIENTED PROGRAMMING II
Credit Units	3
Pre-requisite	Object Oriented Programming I Data structures and algorithms
Purpose of the Course	The purpose of this course is to advance the knowledge of students in object-oriented programming as they write more complex programs.
Expected Learning Outcomes	<p>At the end of the course the students will be able to:</p> <ol style="list-style-type: none"> 1. Appropriately use the features of OOP, which include exception handling, polymorphism, overloading and inheritance; 2. Appropriately apply advanced techniques in programming, which include smart pointers and reference counting; 3. Appropriately use Standard Template Library and other types of templates; 4. Develop multi-thread applications; 5. Develop interfaces using MFC files.

Course Content	Hiding the Implementation, Initialization & Cleanup, Passing & Returning Objects, dynamic object creation, Reusing classes (Inheritance and composition). Advanced Object Oriented Programming topics: Interfaces & Inner Classes, Polymorphism and inheritance, memory management internals, handling exception and safety. generic programming: run-time type identification, templates and partial specialization, auto pointers, traits and traits classes, design patterns, proxy classes, multiple dispatch, operator overloading etc. Collections of Objects: Arrays, Container, Iterators. I/O System with streams. Concurrency. Coding guidelines, programming guidelines.	
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	1. C++ Programming from Problem analysis to program design, D. S. Malik, ThomsonCourse Technology, 2006, ISBN: 1418836397, 978 1418836399 2. C++: how to program, Deitel, HM. Deitel, PJ. 5 th ed prentice hall 2005, ISBN: 131857576 3. Object-oriented programming with C++, E. Balagurusamy, McGraw-Hill Publishing Company Limited 2006, ISBN: 978 0070593626	
Course Name	INTRODUCTION TO DATABASES	
Credit Units	3	
Pre-requisite	Software Engineering	
Purpose of the Course	To introduce students to the principles of design and implementation of database systems.	
Expected Learning Outcomes	At the end of the course the students will be able to: 1. Develop a database from logical to physical design; 2. Map a physical design to a database management system; 3. Apply SQL in operating database systems.	
Course Content	Introduction to database systems. File systems and databases. Definitions and terminology. Database models + Modelling techniques. Entity Relational Modelling, Normalization techniques; Normalization anomalies. The relational system; Relational Calculus; Relational Algebra. Enterprise rules and constraints; Joins and relational algebra operations. Introduction to Transaction management and concurrency control.	
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	

Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	50
	Practical lab-Continuous Assessment	50
	Total	100
Recommended reference material	1. Fundamentals of Database Systems. Second Edition, Ramez Elmasri, Shamkant B. Navathe, Addison-Wesley Pub Co, ISBN: 0805317481 2. Database Systems: A Practical Approach to Design, Implementation, and Management, Thomas M. Connolly, Carolyn E. Begg, Addison-Wesley Pub Co, ISBN: 0201342871 3. Oracle Database Environment and other resources: 4. http://www.wbluhm.com/MySQLTut.html 5. http://osiris.sund.ac.uk/~cs0dne/Teaching/com348.html 6. http://www.booksites.net/download/connbegg/download.htm	

Course Name	PLATFORM TECHNOLOGIES II
Credit Units	3
Pre-requisite	Digital Electronics
Purpose of the Course	To advance students' understanding of the concepts underlying current implementations of Computer Architecture and Organization.
Expected Learning Outcomes	At the end of the course the students shall be able to: <ol style="list-style-type: none"> 1. Identify contributors to computer architecture and organization; 2. Explain the rationale and strategies for different architectures; 3. Identify the components of a computer; 4. Compare and contrast different computer architectures; 5. Illustrate the relationship between computer engineering and computer architecture and organization.

Course Content	<p>History and overview of computer architecture and organization: system organization and architecture, memory, interfacing, microprocessors, and performance ; Computer organization and computer architecture ; Binary arithmetic; Design of a computer ; Interfacing computer components and peripherals ; CPU and its organization ; Performance and alternate architectures; Caching and performance ; Strategies used in architecture: CISC, RISC approaches ; Strategies of multiprocessing and their potential ; Resources of computer architecture and organization ; purpose and role of computer architecture and organization in computer engineering; Fundamentals of computer architecture: Organization of the von Neumann machine ; Instruction formats ; The fetch/execute cycle; instruction decoding and execution ; Registers and register files ; Instruction types and addressing modes ; Subroutine call and return mechanisms ; Programming in assembly language ; I/O techniques and interrupts ; Computer arithmetic: Representation of integers (positive and negative numbers) ; Algorithms for common arithmetic operations (addition, subtraction, multiplication, division) ; significance of range, precision, and accuracy in computer arithmetic ; Representation of real numbers (standards for floating-point arithmetic); Algorithms for carrying out common floating-point operations ; Converting between integer and real numbers ; Multi-precision arithmetic ; Hardware and software implementation of arithmetic unit ; The generation of higher order functions from square roots to transcendental functions; Memory system organization and architecture: Memory systems hierarchy; Coding, data compression, and data integrity ; Electronic, magnetic and optical technologies ; Main memory organization and its characteristics and performance ; Latency, cycle time, bandwidth, and interleaving ; Cache memories (address mapping, line size, replacement and write-back policies); Virtual memory systems ; Memory technologies such as DRAM, EPROM, and FLASH ; Reliability of memory systems; error detecting and error correcting systems; Interfacing and communication: I/O fundamentals: handshaking, buffering; I/O techniques: programmed I/O, interrupt-driven I/O, DMA ; Interrupt structures: vectored and prioritized, interrupt overhead, interrupts and reentrant code ; Memory system design and interfacing ; Buses: bus protocols, local and geographic arbitration; Device subsystems: External storage systems; organization and structure of disk drives and optical memory ; Basic I/O controllers such as a keyboard and a mouse; RAID architectures ; Video control; I/O Performance ; SMART technology and fault detection ; Processor to network interfaces .</p>
Mode of delivery	Lectures, directed reading, practical demonstrations of typical computing systems.
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software

Course Assessment	Type		Weighting (%)	
	Examination		60	
	Continuous Assessment		40	
	Total		100	
Core Reading Material for the course	TITLE	AUTHOR	PUBLISHER	ISBN
	Computer Architecture: A quantitative approach	John L. Hennessy, David A. Patterson	Morgan Kaufmann Publishers	978-1558603295

Course Name	COMPUTER NETWORKS
Credit Units	3
Pre-requisite	Data Communications
Purpose of the Course	The purpose of this course is to provide students with a theoretical background and practical understanding of the techniques and technologies that are used to build data communications networks and the applications which use them.
Expected Learning Outcomes	At the end of the course, students will be able to: <ol style="list-style-type: none"> 1. Design, install, and configure a home computer network; 2. Differentiate networks based on telephony and Internet standards including topology, services, philosophy, and the standards process; 3. Relate packet loss to the Internet, reduction of network cost and improvement of latency; 4. Demonstrate the use of various technologies including ISDN, DSL, ATM, SONET, WAP, VOIP and DNS.
Course Content	Types of computer networks, peer-to-peer and server-based networking, public and private networks, value added networks, error detection and correction: Topologies, OSI reference model, ISDN, Multimedia, emerging services, standard components. Telephone systems, key systems, switches, bridges, routers configurations, facilities in exchanges, connecting to LAN/PBX/ACD, computer telephone integration, cables - fiber, Copper, connections, Switches - configuration, ISDN, DSL technologies, ATM, SONET, WAP, VOIP, Mobile services. Internet: Introduction, web functions, privacy and security, Internet addressing and Domain Name Service(DNS); ICMP, IPV4 and IPV6;. Network Management: functions, operating system linkages, managed switches, remote configuration and management. Performance studies: performance indices, simulation.
Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.

Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	<p>1. Forouzan B. A. (2005) Data Communications and Networking. 4th Ed. New Delhi: Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-063414-9</p> <p>2. Comer D. E. & Stevens D. L. (2001) Internetworking with TCP/IP Client-Server Programming and Applications Linux/POSIX Sockets Version. New Jersey : Prentice Hall PTR, ISBN 0130320714</p> <p>3. Tanenbaum A. S. (2003) Computer Networks. 4th Ed. New Jersey : Prentice Hall PTR, ISBN 0130661023</p> <p>4. Microsoft Corporation (1997) Networking Essentials. 2nd Ed. Washington : Microsoft Press, ISBN 1-57231-527-X</p>	

Course Name	EVENT DRIVEN PROGRAMMING
Credit Units	3
Pre-requisite	Introduction to Programming
Purpose of the Course	The purpose of this course is to provide students with the knowledge and skills needed to harness the power of a computer to do new tasks by creating their own software as opposed to using existing programs in an event driven program development environment.
Expected Learning Outcomes	At the end of the course, students will be able to: <ol style="list-style-type: none"> 1. Apply the various controls included in event driven programming languages; 2. Design, develop, test and implement software application projects; 3. Write, test, debug and document event procedure coding; 4. Demonstrate the use of menus, forms and dialog boxes in an event driven program; 5. Develop codes that respond to exception conditions raised during execution.
Course Content	Event-driven programming; Objects, data types, variables and constants, input box and message box. Intrinsic controls: picture box, label, list box, combo box, image, line and shape, timer, drive, directory, file list box, scroll bar, option button, check box and data control. Multiple document interface. Event-handling methods, Event propagation, Database development: data access objects, working with data files, retrieving remote data, multiple user issues, performance issues and attaching SQL tables. Create a database using the data manager program. Active-x/applets controls, Exception handling.
Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.

Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Recommended reference material	1. Schneider D.I. (2005) An Introduction to Programming Using Visual Basic 2005. 6th Ed. Upper Saddle River, N.J. : Pearson/Prentice Hall, ISBN 0130306541 2. Kerman M., & Brown, R. (2000) Computer programming fundamentals with applications in Visual Basic 6.0. Reading, MA : Addison-Wesley, ISBN 0201612682 3. Ablan J. et al. (2003) Professional Visual Basic 6: the 2003 Programmer's Resource, Birmingham : Wrox Press, ISBN 186100222X 4. Halvorson M. (2003). Microsoft Visual Basic 6.0 Professional Step by Step. Redmond, WA : Microsoft Press, ISBN 0735618836.	

Course Name	NETWORK ADMINISTRATION AND MANAGEMENT
Credit Units	3
Pre-requisite	1. Data communications 2. Computer networks
Purpose of the Course	The enhance students' understanding of the principles of computer network administration and help them acquire the necessary knowledge, skills and practical experiences
Expected Learning Outcomes	At the end f the course, students will be able to: 1. Install and maintain services and daemons; 2. Backup and restore all or parts of the system; 3. Develop management plans for procurement, installation and maintenance of networks; 4. Carry out network performance audits including security and performance tuning.
Course Content	Operating Systems: Installation; Configuration; Maintenance; service packs, patches; Server services; print, file, DHCP, DNS, FTP, HTTP, mail, SNMP, telnet; Client services; Support. Applications: Installation; Configuration; Maintenance; service packs, patches; Server services; database, web, network services; Client services; Support Administrative Activities: Content management; Content deployment; (file system planning and structure); Server administration and management; User and group management; Backup management; Security management; Disaster recovery; Resource management; Automation management (automatic job scheduling); Site management notebooks and documents; System support; User support and education. Administrative Domains: Web domain; Network domain; Database domain; OS domain; Support domain.

Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Course Name	Systems Analysis and Design
Credit Units	3
Pre-requisite	Information Technology Fundamentals Fundamentals of programming
Purpose of the Course	To expose the students to the fundamental of system analysis and design, feasibility studies, data gathering, system design and software documentation.
Expected Learning Outcomes	At the end of the course, the student should be able to: 1. Explain the concept of feasibility studies and data gathering; 2. Describe the essential analysis process technique for effective software design; 3. Design system based on the concepts the system development lifecycle; 4. Formulate data dictionaries, process specifications and structured decisions.
Course Content	Introduction to systems analysis and design. Introduction to general systems theory. Players in the systems game. Information systems building blocks. Information systems development: Software development life cycle; specification, analysis, design, implementation and testing. Project Management: project management tools and source code control systems (SCCS). Feasibility analysis and system proposal. Systems Analysis; Requirements discovery; deliverables; CASE tools for system analysis and design, data modeling and process modeling tools (data flow diagrams, entity relationship diagrams), traditional and prototyping approaches; Data modeling and analysis; Process modeling. Systems Design: Applications architecture and modeling; Database design; I/O design, input validation and user interface design (GUI).
Mode of delivery	Lectures , directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools.

Course Assessment	Type	Weighting (%)
	Examination	60
	Practical lab-Continuous Assessment	40
	Total	100
Recommended reference material	1. System Analysis and Design 6th Ed. Kenneth Kendall and Julie Kendall. Prentice Hall. ISBN. 0131454552 2. Systems Analysis and Design 2nd Edition. 2003. Donald Yeates, Tony Wakefield. ISBN 0273655361. 3. http://camden-www.rutgers.edu/dept-pages/business/kendall/sad.html 4. Systems Analysis and Design. 3rd Edition. Shelly Cashman, Rosenblatt. ISBN.0789542668. 5. http://www.scsite.com/sad3e/	
RESEARCH METHODOLOGY AND TECHNICAL WRITING		
Credit Units	3	
Pre-requisite	1. Probability and statistics 2. IT project management	
Purpose of the Course	To equip students with the necessary tools to develop and present data-based project proposals and undertake a scientific research.	
Expected Learning Outcomes	At the end of the course, the students are expected to: 1. Develop skills of finding and analyzing data; 2. Critically analyze various approaches to the construction of knowledge; 3. Conduct, document and report a state-of-the-art Research; 4. Compare various research techniques; 5. Collect, analyze, consolidate and interpret data; 6. Apply statistical tools to arrive at logical conclusions.	
Content	Nature and Characteristics of Research; Characteristics of Research; Research Problem and Objectives; Review of Related Literature; Research Design; Qualities of a Good Research Instrument; Sampling Designs; Statistical Treatment; Data Analysis and Interpretation; Participatory Research; Preparation of Proposals for IS Projects; Thesis Writing; Documentation of IS Paper.	
Learning and Teaching Methodologies	Lectures, small group discussion, small group research project and tutorials	
Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Recommended Reading	TITLE	AUTHOR	PUBLISHER	ISBN
	1. Research Methodology: Methods and Techniques. Kothari. Wishwa Prakashan 2. Research Methods for Business Students. Saunders, Lewis, Thornbill. Pitman Publishing. ISBN: 0-273-62017-7			
Support Materials and Resources	Rossi, Peter H., James D. Wright, and Andy B. Anderson (eds.). 1983. <u>Handbook of Survey Research</u> . San Diego: Academic Press, Inc.			

Course Name	HUMAN COMPUTER INTERACTION
Credit unit	3
Pre-requisite	Fundamentals of Programming
Purpose of the Course	The course introduces students to the various facets of HCI including human factors, HCI aspects of application domains, human-centered evaluation, effective interfaces, accessibility, emerging technologies and human -centered software development
Expected Learning Outcomes	At the end of the course students will have: 1. Analyze human computer interaction problems; 2. Identify and define the computing requirements appropriate for solving HCI problems; 3. Design, implement, and evaluate a computer-based system, process, component and program to meet desired needs; 4. Identify and analyze user needs; 5. Select, create, evaluate and administer computer-based systems; 6. Effectively integrate IT-based solutions into the user environment; 7. Apply cognitive principles to product design.
Course Content	Human Factors: Cognitive principles; perception, memory, problem solving; Understanding the user; Designing for humans; affordances, conceptual models, feedback, constraints, mapping, stages of action; Ergonomics; HCI Aspects of Application Domains: Types of environments; Cognitive models; Approaches. Human-Centered Evaluation: Heuristics; Usability testing; Usability standards; international, OS, accessibility. Developing Effective Interfaces: Understanding the user experience; Understanding interaction styles; Matching interface elements to user requirements; Graphical user interfaces; Non-graphical user interfaces; Localization & globalization; Development tools; environments, HTML; Prototyping. Accessibility: Biometrics; Repetitive stress syndrome; Accessibility guidelines and regulations; ADA 508, NIMAS, UDL, WCAG. Emerging Technologies: Alternative input/output devices; Alternative displays (heads-up, goggles, etc.); Mobile computing; Wearable computing; Virtual reality systems; Pervasive computing; Sensor-nets. Human-Centered Computing1: Human-centered design methods; Software development lifecycle; User analysis; profiles, personas; Social computing; Task analysis; Scenarios, Use cases.

Mode of delivery	Lectures , directed reading, Group/class discussions and practical exercises
Instructional Material and/or Equipment	Audi visual equipment, Computers, writing boards, writing materials, projectors.
Course Assessment	Assignments, tutorials, tests, practical exercises and written examinations.

Course Name	INFORMATION ASSURANCE AND SECURITY I
Credit unit	3
Pre requisite	Networking
Purpose of the Course	This course introduces students to the fundamental aspects of IAS, vulnerabilities, attacks and defense mechanisms and security services.
Expected learning outcomes	At the end of the course, students should be able to: 1. Relate threats, vulnerabilities, countermeasures, attacks, compromises and remediation; 2. Rationalize the in-building of information assurance and security into design and architecture; 3. Outline the system life-cycle and its relationship to security; 4. Describe the Security Services as defined by the MSR model; 5. Discuss the social engineering techniques used to gain access to computing and network assets in an organization; 6. Describe white hat, black hat, hacker and cracker.
Course Content	Fundamental Aspects: History and terminology, Security mindset (reasoned paranoia): Design principles (defense in depth), System/ security life-cycle, Security implementation mechanisms: Gates, guards, guns, cryptography, Information assurance analysis model: MSR model*, threats, vulnerabilities, attacks, countermeasures, Disaster recovery (natural and man-made); Security Mechanisms: Cryptography: Cryptosystems, Keys: symmetric & asymmetric, Performance (software/hardware), Implementation; Authentication: "Who you are, what you have, what you know", Bio-authentication (use of biometrics); Redundancy: Intrusion detection; Attacks: Social engineering, Denial of service, Protocol attacks, Active attacks, Passive attacks' Buffer overflow attacks, Malware (viruses, Trojan horses, worms); Security Services: Availability, Integrity, Confidentiality, Authentication (source reliability), Non-repudiation; Vulnerabilities: Perpetrators, Inside attacks, External attacks, Black hat, White hat, Ignorance, Carelessness, Network, Hardware (design, implementation, installation, etc.), Software (design, implementation, installation, etc.), Physical access.
Mode of delivery	Lectures, Tutorials, directed reading and hands-on laboratory sessions and projects.

Instructional Material and/or Equipment	Audio-visual equipment, chalkboard, PCs and networking equipment for lab simulations. Security software tools.			
Course Assessment	Type		Weighting (%)	
	Examination		60	
	Coursework		40	
	Total		100	
Core Reading Material for the course	TITLE	AUTHOR	PUBLISHER	ISBN
	Cryptography and Network Security. 4 Ed.	Stallings, W	Prentice Hall	
Recommended reference material	<p>1. Cryptography and Data Security. HB, Denning, Do. Addison-Wesley. ISBN 0201101505</p> <p>2. Fundamentals of computer security technology. PB. Amoroso, Ed. Prentice Hall US. ISBN 0131089293</p> <p>3. Information Assurance for the Enterprise: A Roadmap to Information Security (McGraw-Hill Information Assurance & Security) by Corey Schou and Daniel Shoemaker</p> <p>4. Information Assurance: Managing Organizational IT Security Risks by Joseph Boyce Employee of the Department of Defense and Daniel Jennings Information Systems Security Manager European Command (EUCOM)</p> <p>5. Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions (Advances in Information Security and Privacy) by Kenneth J. Knapp.</p> <p>6. Information Assurance: Dependability and Security in Networked Systems (The Morgan Kaufmann Series in Networking) by Yi Qian, David Tipper, Prashant Krishnamurthy, and James Joshi.</p> <p>7. Information Assurance: Security in the Information Environment (Computer Communications and Networks) by Andrew Blyth and Gerald L. Kovacich.</p> <p>8. Information Systems Auditing and Assurance by James A. Hall and Tommie Singleton.</p>			

Course Name	INFORMATION ASSURANCE AND SECURITY II
Credit Units	3
Pre requisite	Information Assurance and Security I
Purpose of the Course	This course exposes students to IAS in terms of operational issues, policies and procedures, domain security, forensics, information states, risk analyses and recovery.

Expected learning outcomes:	By the end of the course, the students will be able to: <ol style="list-style-type: none"> 1. Describe legal and ethical considerations related to the handling and management of enterprise information assets; 2. Describe the purpose and elements of the key types of security audits; 3. Discuss the impact of various security standards on the direction of audits; 4. Develop policies to guard against password vulnerabilities in organizations; 5. Discuss the impact of IAS on society and on one's professional and personal practice; 6. Describe the types of legal systems used in the world; 7. Relate digital forensics to other forensic disciplines; 8. Identify the aspects of a business that may be impacted by a security breach or interruption of operation. 	
Course Content	Operational Issues: Trends, Auditing, Cost / benefit analysis, Asset management, Standards, Enforcement; Legal issues, Disaster recovery (natural and man-made); Policy: Creation of policies, Maintenance of policies, Prevention, Avoidance, Incident response (forensics), Domain integration (physical, network and internet); Security Domains: Security awareness, Possible Domains: Human-Computer Interaction, Information Management, Integrative Programming, Networking, Program Fundamentals, Platform Technologies, System Administration, System Integration and Architecture, Social and Professional Issues, Web Systems, Physical plant; Forensics: Legal systems, Digital forensics and its relationship to other forensic disciplines, Rules of evidence, Search and seizure, Digital evidence, Media analysis; Information States: Transmission, Storage, Processing; Threat Analysis Model: Risk assessment, Cost benefit.	
Mode of delivery	Lectures, Tutorials, directed reading and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audio-visual equipment, chalkboard, PCs and networking equipment for lab simulations. Security software tools.	
Course Assessment	Type	Weighting (%)
	Examination	60
	Coursework	40
	Total	100
Core Reading Material for the course	1. Computer Security: Art & Science, Matt Bishop, Addison Wesley, ISBN: 0201440997 2. Information Assurance for the Enterprise: A Roadmap to Information Security (McGraw-Hill Information Assurance & Security) by Corey Schou and Daniel Shoemaker	

Recommended reference material	<ol style="list-style-type: none"> 1. Hacking Exposed: Network Security Secrets & Solutions, Joel Scambray, et al, McGraw-Hill Osborne Media 2004, ISBN: 0072227427 2. Wireless Security: Models, Threats, and Solutions, Randall K. Nichols, McGraw-Hill Professional, 2001, ISBN 0071380388 3. Know Your Enemy: Learning about Security Threats, the HoneyNet Project, Addison-Wesley Professional, 2004, ISBN: 0321166469 4. Cryptography and Data Security. HB, Denning, Do. Addison-Wesley. ISBN 0201101505 5. Fundamentals of computer security technology. PB. Amoroso, Ed. Prentice Hall US. ISBN 0131089293 6. Information Assurance: Managing Organizational IT Security Risks by Joseph Boyce Employee of the Department of Defense and Daniel Jennings Information Systems Security Manager European Command (EUCOM) 7. Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions (Advances in Information Security and Privacy) by Kenneth J. Knapp. 8. Information Assurance: Dependability and Security in Networked Systems (The Morgan Kaufmann Series in Networking) by Yi Qian, David Tipper, Prashant Krishnamurthy, and James Joshi. 9. Information Assurance: Security in the Information Environment (Computer Communications and Networks) by Andrew Blyth and Gerald L. Kovacich. 10. Information Systems Auditing and Assurance by James A. Hall and Tommie Singleton.
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Course Name	WEB SYSTEMS AND TECHNOLOGIES I
Credit Units	3
Pre requisite	<ol style="list-style-type: none"> 1. Networking 2. Fundamentals of Programming 3. Introduction to databases
Purpose of the Course	The course aims at introducing students to designing, implementing and testing web-based applications including related software, databases, interfaces and digital media. It also exposes students to social, ethical and security issues arising from the Web and social software.

Expected learning outcomes:	<p>At the end of the the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe the structure of the World Wide Web, protocols and technologies used in web services and distributed Web applications, Web standards and standards bodies; 2. Create and validate HTML/XHTML documents; 3. Appropriately apply presentation technologies, which include Cascading Style Sheets and DHTML; 4. Appropriately use of server-side backend databases in web sites and web applications; 5. Compare and contrast data entry and validation techniques in client-side and server-side programming; 6. Ceate, record and deploy media content using proprietary media and interaction technologies including Flash, Active X, RealMedia; 7. Build a simple web site using cascading style sheets to create style standards. 			
Course Content	<p>Web Technologies: HTTP protocol, Presentation abstractions, Web-markup and display languages, Client-side programming, Server-side programming, Web services, Web servers, Emerging technologies, Standards & standards bodies; Information Architecture: Hypertext/ hypermedia: Effective communication, Interfaces, Navigation schemes, Media types, Web design process: User modeling and user-driven design, Web design patterns, Information organization, Usability, N-Tier architectures; Digital Media: Digital libraries, Media formats, Capture, authoring and production tools, Compression, Streaming media; Social Software: Asynchronous and synchronous communication modalities, Broadcast communication modalities, Collaborative and community modalities, Ethical issues: Digital Divide, Freedom of Speech vs. hate speech, Pornography, Privacy, Copyrights, digital content rights.</p>			
Mode of delivery	Lectures, Tutorials, directed reading and hands-on laboratory sessions and projects.			
Instructional Material and/or Equipment	Audio-visual equipment, chalkboard, PCs and access to a Web server and a database server.			
Course Assessment	Type		Weighting (%)	
	Final Project		60	
	Coursework		40	
	Total		100	
Core Reading Material for the course	TITLE	AUTHOR	PUBLISHER	ISBN
	1. Web Technologies: A Computer Science Perspective by Jeffrey C. Jackson			
	2. Web Application Architecture: Principles, Protocols and Practices by Leon Shklar and Rich Rosen			
	3. Practical Web Technologies by P. K. Yuen and Vincent Lau			

Recommended reference material	<ol style="list-style-type: none"> 1. Exploring Web Technologies for Designers (Design Exploration) by James Bennett 2. Web Services: Principles and Technology by M. Papazoglou 3. BEAULIEU, M. 2002. Wireless Internet Applications and Architecture. Addison-Wesley, Boston, MA. 4. The Internet Complete Reference, Hann, H. Osborne , McGraw-Hill, 5. ISBN: 0-07-882138-X 6. The World Wide Web Complete Reference, Hann, H. Osborne , McGraw-Hill, ISBN: 0-07-882142-8
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Course Name	WEB SYSTEMS AND TECHNOLOGIES II
Credit Units	3
Pre requisite	Web Systems and Technologies I
Purpose of the Course	The course is aimed at advancing students' skills in designing, implementing and testing web-based applications including related software, databases, interfaces and digital media. It also advances students' knowledge in social, ethical and security issues arising from the Web and social software.
Expected learning outcomes:	<p>At the end of the course, the student will be able to:</p> <p>Develop interactive web interfaces;</p> <p>Describe the methods of security for cookies;</p> <p>Discuss ways of using cookies to compromise user privacy, security certificates, public key encryption, identify DNS poisoning to implement phishing, SQL injection techniques, spyware, viruses, denial of service attacks;</p> <p>Develop client-protection mechanisms against cookies;</p> <p>Design and implement web applications that meet internationally set standards.</p>
Course Content	Web Development: Web interfaces, Web site implementation and integration, Database integration, Accessibility issues, Web accessibility initiative; Vulnerabilities: Client Security: Cookies and web beacons, Phishing, Transaction security - certificates and secure connections, Spyware, Viruses, Man-in-the-middle attacks; Server security: Securing a server, Securing a host, Denial-of-service attacks; Attacks via clients (e.g. zombies and DOS); DNS poisoning.
Mode of delivery	Lectures, Tutorials, directed reading and hands-on laboratory sessions and projects.
Instructional Material and/or Equipment	Audio-visual equipment, chalkboard, PCs and Web server access. Web authoring tools such as Dreamweaver, Flash, etc.

Course Assessment	Type	Weighting (%)
	Website Development Project	60
	Coursework	40
	Total	100
Core Reading Material for the course	1. HTML & XHTML: The Definitive Guide (6th Edition) 2. JavaScript: the definitive guide, Flanagan, D. O'Reilly Media Inc ISBN: 1-56592-392-8 3. JavaScript and DHTML Cookbook, Goodman, D., O'Reilly Media Inc, ISBN: 0-596-00467-2 4. PHP and MySQL Web Development, Welling and Thompson, Sams, 5. ISBN: 0672317842, 978-0672317842 6. Beginning PHP and MySQL: From Novice to Professional, Jason Gilmore, Apress (2008), ISBN: 1590598628, 978-1590598627 7. PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide, 2007), ISBN: 978-0321525994 8. Beginning ASP.NET 3.5: In C# and VB (Programmer to Programmer) by Imar Spaanjaars 9. The Web Application Hacker's Handbook: Discovering and Exploiting Security Flaws by Dafydd Stuttard and Marcus Pinto	
Recommended reference material	1. Dreamweaver 8 Bible, Lowery, J. Wiley, ISBN: 0471763128 2. Web Design: The Complete Reference, Hann, H. Osborne , McGraw-Hill, ISBN: 0-07-212297-8 3. HTML for the World Wide Web with XHTML and CSS, Fifth Edition by Elizabeth Castro 4. Professional ASP.NET 4 in C# and VB by Bill Evjen, Scott Hanselman, and Devin Rader	
Course Name	WIRELESS AND MOBILE COMPUTING	
Credit Units	3	
Pre-requisite	1. Networking 2. Introduction to databases 3. Object-Oriented Programming I and 2	
Purpose of the Course	To introduce students to the fundamental concepts underlying current developments in mobile applications and wireless networks.	
Expected Learning Outcomes	At the end of the course, the students will be able to: 1. Evaluate communication standards used in today mobile computing; 2. Develop applications for a mobile device; 3. Describe caching, data replication, and synchronization in mobile computing.	

Course Content	Overview of current hardware, software; and communication standards for mobile computing, distinction between mobile and distributed computing; Development of mobile applications, software tools, languages, and APIs; Mobile networking and standards in depth, service location, data dissemination, routing; Mobile agents, caching, and data replication and synchronization; Introduction to wireless networking: Advantages and disadvantages of wireless networking, Characteristics of radio propagation. Fading, Multipath propagation; Introduction to digital transmission: Definition of bit-rate and signalling rate; Introduction to synchronous transmission; The need for pulse shaping, synchronisation and line-coding; Calculation of bit-error probabilities when the channel is affected by the addition of Gaussian noise; Narrowband digital modulation; The need for modulation; Binary and multi-level (M-ary) amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying (PSK); Wideband modulation techniques to cope with inter-symbol interference direct sequence spread spectrum Adaptive Equalization Orthogonal frequency division multiplex; Medium Access Control (MAC); MAC protocols for digital cellular systems: GSM; MAC protocols for wireless LANs such as IEEE802.11 and HIPERLAN I and II. The near far effect; Hidden and exposed terminals; Collision Avoidance (RTS-CTS) protocols; Protocols supporting mobility; Mobile network layer protocols: mobile-IP, Dynamic Host Configuration Protocol (DHCP); Mobile transport layer protocols: mobile-TCP, indirect-TCP; Wireless Application Protocol (WAP).	
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Core Reading Material for the course	<ol style="list-style-type: none"> 1. Mobile communications. J. Schiller. Addison-Wesley. ISBN 0-321-12381-6 2. Mobile Computing by Raj Kamal 3. Mobile Design and Development: Practical Concepts and Techniques for Creating Mobile Sites and Web Apps (Animal Guide) by Fling, Brian 4. Beginning Smartphone Web Development: Building Javascript, CSS, HTML and Ajax-Based Applications for iPhone, Android, Palm Pre, Blackberry, Windows Mobile and Nokia S60 by Gail Frederick and Rajesh Lal 5. Fundamentals of Mobile and Pervasive Computing by Frank Adelstein, Sandeep KS Gupta, Golden Richard III, and Loren Schwiebert 	

Recommended reference material	1. Computer Networks, A.S. Tanenbaum, Prentice Hall PTR, 0130661023 2. Mobile Design and Development: Practical Concepts and Techniques for Creating Mobile Sites and Web Apps (Animal Guide) by Fling, Brian 3. Beginning Smartphone Web Development: Building Javascript, CSS, HTML and Ajax-Based Applications for iPhone, Android, Palm Pre, Blackberry, Windows Mobile and Nokia S60 by Gail Frederick and Rajesh Lal
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Course Name	INFORMATION MANAGEMENT	
Credit Units	3	
Pre-requisite		
Purpose of the Course	To enhance students' understanding of the concepts and fundamentals in information management	
Expected Learning Outcomes	At the end of the course the students will be able to: 1. Explain the role of data, information, database management systems and data mining in organizations; 2. Compare and contrast database approach and traditional file processing; 3. Discuss the general types of databases: personal, workgroup, department, enterprise; 4. Discuss data collection mechanisms and their implications; 5. Discuss issues of data retention including the need for retention, physical storage and security. 6. Give the rationale behind data backup in organizations' computing systems; 7. Describe data recovery systems.	
Course Content	Information systems: purpose, use, value; Properties of data: quality, accuracy, timeliness; Database systems; Analysis of data, forms and sources; Data collection; Data retention; Information backup and recovery.	
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Course Name	INTEGRATIVE PROGRAMMING TECHNOLOGIES	
Credit Units	3	
Pre-requisite	1. IT Systems 2. Fundamentals of Information Management	
Purpose of the Course	This course exposes students to integrative programming techniques including intersystems communication, data mapping and exchange, integrative coding, scripting techniques, software security and an overview of programming languages	
Expected Learning Outcomes	At the end of the course, students will be able to: 1. Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs; 2. Apply current technical concepts and practices in the core information technologies; 3. Analyze user needs while selecting, creating, evaluating and administering computer-based systems; 4. Integrate IT-based solutions into the user environment using best practices and standards.	
Course Content	Intersystem Communications: Architectures for integrating systems; DCOM, CORBA, RMI; Web services and middleware; Network programming; Message and queuing services; Low level data communications. Data Mapping and Exchange: Metadata; Data representation and encoding; XML, DTD, XML schemas; Parsing XML documents; XSL, XSLT and XPath. Integrative Coding: Design patterns; Interfaces; Inheritance. Scripting Techniques: Scripting and the role of scripting languages; Creating and executing scripts; Influence of scripting on programming. Software Security Practices: Evidence-based security vs. code access security; Best security coding practices; Authentication to system resources and services; Encryption of data between systems and services. Overview of Programming Languages: History of programming languages; Programming paradigms; Effects of scale; Virtual machines; Compiled vs. interpretative languages; Application vs. scripting languages. Miscellaneous Issues: Adopt & adapt vs. make; Versioning and version control.	
Mode of delivery	Lectures , directed reading, Group/class discussions and practical exercises	
Instructional Material and/or Equipment	Audi visual equipment, Computers, writing boards, writing materials, projectors etc	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Course Name	SOFTWARE ENGINEERING	
Credit Units	3	
Pre-requisite	1. Programming 2. Systems Analysis and Design	
Purpose of the Course	To equip students with basic knowledge and skills in the software engineering process.	
Expected Learning Outcomes	At the end of the course, the students will be able to: 1. Evaluate the overall structure of the software engineering process; 2. Criticize the theories underpinning the software engineering process; 3. Summarize the methodologies available to guide the software engineering process; 4. Apply case tools to software development life cycle.	
Course Content	Introduction: basic concepts, project planning and management. Software process models: waterfall model, incremental process models, evolutionary process models, specialized process models and agile process models. Software requirement analysis and specification. Software design: function-oriented design, object-oriented design, detailed design and programming methodologies. Software testing: testing approaches e.g. unit testing and integration testing; testing tactics e.g. white-box testing, black-box testing and object-oriented testing. Software evolution and CASE tools.	
Mode of delivery	Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.	
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Practical lab-Continuous Assessment	40
	Total	100
Recommended reference material	1. Software Engineering, Sommerville, I., Addison-Wesley 2004, ISBN: 0-201-56898-5 2. Software Engineering - A Practitioners Approach, Pressman, McGraw-Hill. 2005, ISBN: 0-07-050814-3 3. Fundamentals of software engineering, Ghezzi, New Delhi, India Prentice Hall of India 2003, ISBN: 8120322428 4. Software Engineering. 2008. Ivan Marsick, http://www.caip.rutgers.edu/~marsic/books/SE/	

Course Name	SYSTEM ADMINISTRATION
Credit Units	3
Pre-requisite	1. Design and Analysis 2. Systems Development 3. Operating Systems

Purpose of the Course	To students to the fundamental concepts underlying current developments in systems management and administration.			
Expected Learning Outcomes	At the end of the course the students will be able : 1. Install at least one operating systems; 2. Analyze the importance of System configuration to an organization; 3. Exemplify the importance of system maintenance to an organization; 4. Distinguish between server and client services.			
Course Content	Installation; Configuration; Maintenance: service packs, patches; Server services: print, file, DHCP, DNS, FTP, HTTP, mail, SNMP, telnet; Client services; Support Content management; Content deployment: file system planning and structure; Server administration and management; User and group management; Backup management; Security management; Disaster recovery; Resource management; Automation management: automatic job scheduling; Site management notebooks and documents; System support; User support and education; Web domain; Network domain; Database domain; OS domain; Support domain.			
Mode of delivery	Lectures , directed reading, practical demonstrations of parallel computation, and hands-on laboratory sessions and projects.			
Instructional Material and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools			
Course Assessment	Type			Weighting (%)
	Examination			60
	Continuous Assessment			40
	Total			100
Core Reading Material for the course	TITLE	AUTHOR	PUBLISHER	ISBN
	Essential System administration	Ileen Frisch	O' Reilly	0-596-00343-9
Recommended reference material	Unix System Administration Handbook. Evi Nemeth, Garth Snyder, Scott Seebass and Trent Hein. Prentice Hall, ISBN 0-13-020601-6			

	SOFTWARE PROJECT MANAGEMENT
Credit Units	3
Pre requisite	Software Engineering
Purpose of the course	To equip students with skills in IT project management

Expected Learning Outcomes	At the end of the course, the students should be able to: 1. Explain the nature, purposes, significance and techniques of project management in dealing with various Information Systems; 2. Make informed decisions based on the observed feasibility of a chosen project; 3. Manage change, risks, clients, teams and suppliers brought about by a IS project; 4. Plan, monitor, control and report on an IS project.			
Content	Definitions; Managing Change; Business Strategy and Information Systems; The Organizational Framework; The Profile of a Project - Justifying the Project; Project Planning - Understanding the Work; Project Planning - Estimating; Project Planning - Scheduling and Resourcing; Monitoring Progress; Exercising Control; Reporting Progress; Quality Management; Risk Management; Value Management; Selling the Project; Client Management Issues; Managing Suppliers; Leadership; Performance Management; Project Teams; The Working Environment; The Project Manager.			
Learning and Teaching Methodologies	Lectures, small group discussion, case studies, individual projects and tutorials			
Course Assessment	Type		Weighting (%)	
	Examination		60	
	Continuous Assessment		40	
	Total		100	
Recommended Reading	TITLE	AUTHOR	PUBLISHER	ISBN
	Project Management: A Managerial Approach, 2nd ed.,	Meredith, JR. & Mantel, SJ., Jr.,	Wiley	1880410230
	Project Management for Information Systems	Don Yeates and James Cadle	Pitman Publishing T58.6Y43	0273620193
Support Materials and Resources	Texts, audio and video cassettes, computer software Other resources:			

ENTREPRENEURSHIP	
Credit Units	3
Pre-requisite	Technical Writing and Research Methods
Purpose of the course	To equip students with knowledge and skills in entrepreneurship.

Expected Learning Outcomes	At the end of the course, the students will be able to: 1. Examine the nature of entrepreneurship; 2. Evaluate the issues involved in developing businesses; 3. Analyze the process of starting business ventures; 4. Analyze the problems faced by entrepreneurs; 5. Formulate a simple business plan for a small IT enterprise.	
Course Content	Entrepreneurship and entrepreneur defined; The entrepreneur and society; Entrepreneurship and self-employment; The government and Entrepreneurship. Entrepreneurial behaviour; The characteristics/qualities/traits of an entrepreneur; The entrepreneur (owner-manager) and the entrepreneur (employed manager) - differences; Business ideas and opportunities: sources for business idea enabling environmental public policies; NGOs (Non-Governmental Organizations) and evaluating the businessman's resources; Legal aspects of business; Business formation: form of business organization; Registration of business; Trading licenses and other contracts; Sources of finance for small entrepreneurs; Private sources, banks, financial institutions and NGO's co-operatives; Decision-making and risk taking; Decision making process, decision making techniques, types of risks of business, assessing risks in self-employment, minimizing risks; Starting a small IT Enterprise.	
Mode of Delivery	Lectures and Presentations Case studies and Workshop	
Instructional Materials and/or Equipment	Audi visual equipment, chalkboard, computer simulation software, computer programming tools	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100
Core Reading Materials for the Course	Innovation and Entrepreneurship, Drucker, Peter F., Harper & Row, ISBN: 006954284	

	INFORMATION TECHNOLOGY PROJECT
Credit Units	3
Pre-requisite	1. Object Oriented Programming 2 2. System Analysis and Design 3. Database Systems
Purpose of the Course	To provide an opportunity to students to conceptualize and formulate a project that is primarily based on the different concepts in Information Technology.
Expected Learning Outcomes	At the end of the course, students should be: 1. Apply technical writing and documentation skills to project writing; 2. Design and implement an information system project; 3. Present a small-scale IS Project to a panel.

Content	<p><i>This is a project in which the candidate develops a business system that can be implemented, using the techniques introduced in the courses already undertaken. Each project will be supervised by a member of the teaching staff and will run in one semester. Students will be expected to attend a series of seminars on contemporary issues and problems. They will also be expected to give oral presentations of their projects within a semester so as to demonstrate their progress in the project. The deliverables are the developed information system and its related documentation.</i></p>			
Learning and Teaching Methodologies	Seminars, tutorials and consultations.			
Recommended Reading	TITLE	AUTHOR	PUBLISHER	ISBN
	There is no prime text, but various software manuals, research papers and previous project reports, as well as relevant textbooks will be used.			
Support Materials and Resources	A range of hardware and software appropriate to the chosen topics. Full use of the University Library, including the Inter-Library Loan facility and all available electronic resources			

Course Name	MANAGEMENT INFORMATION SYSTEMS (MIS)		
Credit Units	3		
Pre-requisite			
Purpose of the Course	To expose students to the concepts of information systems and general development and application of MIS		
Expected Learning Outcomes	<p>At the end of the course, the students will be able to:</p> <ol style="list-style-type: none"> 1. Define and classify information systems; 2. Apply information systems in making decisions; 3. Assess the impact of MIS in organisations. 		
Course Content	<p>Information Systems concepts: classifications of information systems; Information system infrastructure, managing information resources; Application of MIS in organizations; Strategic information systems: Strategic advantage of information technology; Transaction processing and management reporting; Information systems and decision making; Decision support and executive support systems (DSS, ESS); Information systems development; The evolution of IT planning, Information Technology Economic: Evaluating IT benefits, costs and performance; Managing information system resources; IT impact: on organizations, on individuals at work, societies.</p>		
Mode of delivery	Lectures , directed reading, seminars and tutorials		
Course Assessment	Type	Weighting (%)	
	Examination	60	
	Continuous Assessment	40	
	Total	100	

Course Name	SOCIAL AND PROFESSIONAL ISSUES IN INFORMATION TECHNOLOGY	
Credit Unit	3	
Pre-requisite	Integrative Programming; Information Assurance and Security	
Purpose of the Course	To provide students with knowledge and skills in professional communication, social and organizational contexts of computing, teamwork, intellectual property, legal issues, professional and ethical issues, privacy and civil liberties.	
Expected Learning Outcomes	At the end of the course students will be able to: 1. Communicate professionally with a range of audiences; 2. Analyze the local and global impact of computing on individuals, organizations, and society.	
Course Content	Accessibility issues; Globalization issues; Economic issues in computing; Digital divide. Intellectual Property: Foundations of intellectual property; Ownership of information; Plagiarism; Software piracy; Fair use; Digital Millennium Copyright Act (DMCA); Copyrights, patents, trademarks and trade secrets, NDAs; International differences. Legal Issues in Computing: Compliance (ADA508, FERPA, HIPPA, Sarbanes-Oxley, etc.); Hackers/crackers; Computer crime; Viruses; System use policies & monitoring; Risks and liabilities of computer-based systems; Accountability, responsibility, liability. Organizational Context: Business processes; IT environment; Organizational culture; Professionalism. Professional and Ethical Issues & Responsibilities: Relationships with professional societies; Codes of professional conduct, such as IEEE, ACM, BCS, ITAA, AITP; Ethics and history of ethics; Whistle-blowing; Workplace issues (harassment, discrimination); Identify theft; Ethical hacking. History of Computing: Implications; History of computer hardware, software, History of the Internet; Telecommunications; The IT profession; IT education. Privacy and Civil Liberties: HIPPA and FERPA; E.U. Data Protection; Gramm-Leach-Bailey Act.	
Mode of delivery	Lectures , directed reading, Group/class discussions and practical exercises	
Instructional Material and/or Equipment	Audi visual equipment, Computers, writing boards, writing materials, projectors etc	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100

Course Name	IT and Society
Contact Hours	42
Pre-requisite	Integrative Programming; Information Assurance and Security
Purpose of the Course	Expose students to the professional communication, history of computing, social and organizational context of computing, teamwork concepts and issues, intellectual property, legal issues, professional and ethical issues, privacy and civil liberties

Expected Learning Outcomes	At the end of the course students will be able to: 1. Operate effectively in a team; 2. Assess professional, ethical, legal, security and social issues and responsibilities; 3. Communicate professionally with a range of audiences	
Course Content	Professional Communications: Oral presentations; Technical writing; System documentation; Technical requirements. Teamwork Concepts and Issues: Collaboration; Group dynamics; Leadership styles; Personality types; Collaboration tools. Social Context of Computing: Social informatics; Social impact of IT on society; Online communities & social implications; Philosophical context; Diversity issues; Gender-related issues; Cultural issues; Accessibility issues; Globalization issues; Economic issues in computing; Digital divide. Intellectual Property: Foundations of intellectual property; Ownership of information; Plagiarism; Software piracy; Fair use; Digital Millennium Copyright Act (DMCA); Copyrights, patents, trademarks and trade secrets, NDAs; International differences. Legal Issues in Computing: Compliance (ADA508, FERPA, HIPPA, Sarbanes-Oxley, etc.); Hackers/crackers; Computer crime; Viruses; System use policies & monitoring; Risks and liabilities of computer-based systems; Accountability, responsibility, liability. Organizational Context: Business processes; IT environment; Organizational culture; Professionalism. Professional and Ethical Issues & Responsibilities: Relationships with professional societies; Codes of professional conduct, such as IEEE, ACM, BCS, ITAA, AITP; Ethics and history of ethics.	
Mode of delivery	Lectures , directed reading, Group/class discussions and practical exercises	
Instructional Material and/or Equipment	Audi visual equipment, Computers, writing boards, writing materials, projectors etc	
Course Assessment	Type	Weighting (%)
	Examination	60
	Continuous Assessment	40
	Total	100