

MAKERERE UNIVERSITY

FACULTY OF COMPUTING AND INFORMATION
TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

P.O. BOX 7062, KAMPALA, UGANDA

MASTER OF INFORMATION TECHNOLOGY
(MIT) DEGREE PROGRAMME

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(DAY / EVENING PROGRAMME)

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Master of Information Technology

1. Background to the Master of Information Technology Programme

Modern business is shaped by technological change, competitiveness and globalization. In many organizations, Information Technology (IT) is the strategic asset, which drives competitiveness and supports alliances and partnerships. The Master of Information Technology (MIT) is a two year day / evening degree programme open to all prospective students. This programme was first launched in August 2005. The programme offers flexibility while providing the level of knowledge and skills required by industry and professional bodies. This programme focuses on IT Management and Security, as well as Internet and Web Computing.

The Master of Information Technology (MIT) Degree Programme is offered to give an opportunity to prospective students to undertake training in Information Technology (IT) at a master's degree level. This programme also provides an avenue to those already engaged in the IT-sector without master's degree qualifications in IT to join the MIT Degree Programme. The MIT graduates will help build teaching and research capacity in the universities, especially in the public universities and other tertiary institutions.

The objectives of the programme are to: -

1. Build IT human resource capacity in both the public and private sectors, especially in universities;
2. Develop professionals with theoretical and practical skills in the Information Technology (IT) sector;
3. Address the increasing demand for IT training at Master's degree level;
4. Strengthen capacity and institutional building in the IT discipline in tertiary institutions, private and public sectors.

2. Research and Development

To make learning more research and development oriented in the curriculum, it is necessary to deliver every course (depending on course type) both core and elective with either a strong research or development bias. In other words, the mode of delivery of respective courses should emphasize on students spending more time researching (including reporting/presenting their work/results) and development rather than keeping in class. This is to enable students to learn how to conduct research as well as to learn the various research methodologies. In the curriculum, the

courses in each of the two areas of specialization accommodate the two components i.e. research and development. Regarding the development component, courses on Database Systems, Web Design and Usability, and XML and Web Services are identified to be taught with a strong development bias using the practical hours as reflected in the curriculum. For the research component, all courses taught in the 2nd semester of both plans (Plan A and B), i.e. Project and Organization Change Management, Audit and Security Assurance Principles, IT Strategic Planning and Management, E-Service delivery, and Multimedia and Emerging Technologies, will be taught with a strong bias in research. The output from the research component are to be considered as research lab papers and will constitute end of semester course work assessment.

3. The Programme

3.1. Target group

For the foreseeable future, it is anticipated that MIT program will continue to attract students with a wide range of backgrounds. In traditional graduate programs, it is assumed that entering students have a common background obtained through an undergraduate degree in that field. The MIT program may also attract experienced individuals including IT professionals and people seeking career changes. The architecture of the MIT program accommodates this wide diversity of backgrounds and learning environments. Specifically, the MIT program is appropriate for:

- New graduates with degrees in Information technology, information systems, computer science, software engineering, computer engineering, business degrees; and other bachelor degrees in a range of fields including the humanities, social science, engineering, and physical science with evidence of having taken acceptable courses in information technology.
- Experienced IT professionals seeking to upgrade skills and to understand management issues
- Experienced management professionals seeking skills in managing technology
- Post graduate diploma holders in computing (information technology, information systems, computer science, software engineering, computer engineering) who wish to upgrade to Masters level

3.2. Admission Requirements

To qualify for admission, a candidate must fulfill the general Makerere University entry requirements for a master's degree, and in addition a candidate must be a holder of either:

- a. A Postgraduate Diploma in Information Technology, Information Systems, Computer Science, Software Engineering and computer engineering from a recognized University/ Institution; Or

- b. A bachelor's degree in Information Technology, Information Systems, Computer Science, Software Engineering and computer engineering from a recognized University/Institution; Or
- c. Any other degree with evidence of having taken acceptable courses in Information Technology.

Upgrading PGD IT to MIT degree

When a student graduates with a Postgraduate Diploma in Information Technology (Lower Second Class, Upper Second Class or First Class), s/he can apply for the Master of Information Technology in second year. In such a scenario, the applicant is expected to either take on Plan A or Plan B. With Plan A, the applicant is expected to undertake research for one year which is equivalent to semesters III & IV course load that is covered on the Master of Information Technology programme. With Plan B, the applicant is expected to undertake semester III courses and a project in semester IV as stipulated in the MIT programme.

The upgrading of the PGD IT to the MIT described above must be supported by the relevant academic documents attained from the PGD IT of Makerere University. This must be done for purposes of analyzing the relevant academic courses that must have been attempted as per the current MIT curriculum. Any courses that were not attempted by the applicant as per the first and second semesters' course load of the current MIT curriculum must be undertaken.

On the other hand, when a student graduates with a Postgraduate Diploma in Information Technology (Pass), s/he can apply for the Master of Information Technology but for two academic years i.e. has to start from first year.

3.3. Nature of the Programme

This is a day / evening programme that is completely privately sponsored and its duration is two years.

Students on the MIT Degree Program can follow Plan A or Plan B study plans.

3.3.1. Plan A

Students under Plan A are required to take two semesters of course work and two semesters of dissertation. To qualify for plan A, a student shall have completed all their course work and have a research proposal latest by the second week of semester two.

3.3.2. Plan B

Students under Plan B are required to take three semesters of coursework and one semester of a project. To qualify for plan B a student shall have completed all their coursework and also have a research proposal by the second week of the third semester.

3.4. Duration

The duration for the Master of Information Technology (MIT) degree programme are two (2) academic years comprising 4 semesters.

3.5. Tuition Fees

Tuition fees payable by the students will enable the University sustain the program. Ugandan students will pay tuition fees totaling to Three Million and Eight Hundred twenty five thousands shillings (3,825,000/=) per year. International students will pay tuition fees of 3,350 US Dollars per year.

4. Regulations

The general regulations for Master Degrees of Makerere University shall apply and these shall also include:

- Applications, registration, academic integrity, examination, research proposal writing and supervision;
- Guidelines for submission of progress reports and final dissertation for Plan A and report for Plan B shall apply.

4.1. Course Assessments

a) Each Course will be assessed on the basis of 100 total marks with proportions as follows:

Coursework – 40; and

Examination – 60

b) A minimum of two course assignments/tests shall be required per course.

c) Course work shall consist of tests, group assignments and presentations in each semester. In the second year, assessment shall also include the evaluation of individual research projects for both Plan A and B.

4.2. Grading of Courses

- (i) Each Course will be graded out of a maximum of 100 marks and assigned an appropriate letter grade and a grade point as follows:

MARKS %	LETTER GRADE	GRADE POINT	INTERPRETATION
90 - 100	A+	5.0	Exceptional
80 - 89	A	5.0	Excellent
75 - 79	B+	4.5	Very good
70 - 74	B	4.0	Good
65 - 69	C+	3.5	Fairly good

60 - 64	C	3.0	Pass
55 - 59	D+	2.5	Marginal Fail
50 - 54	D	2.0	Clear Fail
45 - 49	E	1.5	Bad Fail
40 - 44	E-	1.0	Qualified Fail
Below 40	F	0.0	Qualified Fail

b) The following additional letters will be used, where appropriate: -

W	-	Withdraw from Course;
I	-	Incomplete;
AU	-	Audited Course Only;
P	-	Pass;
F	-	Failure.

4.3. Minimum Pass Mark

A minimum pass grade for each course shall be 3.0 grade points.

4.4 Calculation of Cumulative Grade Point Average (CGPA)

The CGPA shall be calculated as follows: -

$$CGPA = \frac{\sum_{i=1}^n (GP_i * CU_i)}{\sum_{i=1}^n CU_i}$$

Where GP_i is the Grade Point score of a particular course i ;

CU_i is the number of Credit Units of course i ; and

n is the number of courses so far done.

4.5. Progression

Progression through the programme shall be assessed in three ways:

4.5.1 Normal Progress

This occurs when a student passes each course taken with a minimum Grade Point of 3.0.

4.5.2 Probationary

This is a warning stage and occurs if either the cumulative grade point average (CGPA) is less than 3.0 and/or the student has failed a core course. Probation is waved when these conditions cease to hold.

4.5.3 Discontinuation

When a student accumulates three consecutive probations based on the CGPA or the same core course(s), he/she shall be discontinued. A student who has failed to obtain at least the pass mark (60%)/ grade point of 3.0 during the third assessment in the same course(s) he/she had retaken shall be discontinued from his/her studies at the University. A student who has overstayed in an academic programme by more than two (2) years shall be discontinued from his /her studies at the university.

4.5.4. Re-taking a Course

A student may re-take any course when it is offered again in order to pass if the student had failed this course. A student may take a substitute elective, where the student does not wish to re-take a failed elective.

4.6. Weighting System

The weighting unit is the Credit Unit (CU). The Credit Unit is 15 contact hours per semester. A contact hour is equal to (i) one lecture hour, (ii) two practical hours or (iii) two tutorial hours

4.7. Master's Dissertation

Students are required to demonstrate their ability to independently formulate a detailed dissertation proposal, as well as develop and demonstrate their dissertation thoroughly.

- a. A candidate shall be allowed to formally start on the dissertation after the second semester.
- b. A candidate shall submit a dissertation proposal to the Institute of Computer Science Higher Degrees Committee during the second semester of the first academic year.
- c. The candidate shall execute the dissertation during second year (the third and fourth semesters).
- d. The candidate shall submit a dissertation report by the end of the fourth semester.

4.7.1. Passing of a Dissertation

To pass the Dissertation, the candidate shall satisfy the Internal Examiner, External Examiner, and Viva Voce Committee independently.

4.7.2 Revised Dissertation

A candidate, who fails to satisfy the examiners, shall re-submit a Revised Dissertation in accordance with the standing University guidelines for the dissertation examinations.

4.8. Master's Project

Students are required to demonstrate their ability to independently formulate a detailed Project Proposal, as well as develop and demonstrate their Project thoroughly.

- a. A candidate shall be allowed to formally start on the Project after the third semester.
- b. A candidate shall submit a Project Proposal to the Institute of Computer Science Higher Degrees Committee during the third semester.
- c. The candidate shall execute the Project during the fourth semester.
- d. The candidate shall submit the Project Report by the end of the fourth semester.

4.8.1. Passing of a Project

To pass the Project, the candidate shall satisfy the examiners in a written report and viva voce independently.

4.8.2. Revised Project Report

A candidate, who fails to satisfy the examiners, shall re-submit a Revised Project Report in accordance with the standing University guidelines for the project examinations.

4.9. Minimum Graduation Load

To qualify for the award of the degree of Master of Information Technology under Plan A (Plan B), a full-time candidate is required to obtain a minimum of 29 credit units (41 credit units) for courses passed including all the compulsory courses; and the Master's Dissertation – 10 CU (Master's Project Report – 5 CU) within a period stipulated by the School of Graduate Studies, usually not exceeding five (5) years from the date of registration.

4.10. Knowledge Areas Covered in the Program

The curriculum is based on 4 broad knowledge areas that make up practical and resourceful Information Technology specialists. These are:-

1. IT Management
2. IT Security
3. Internet and Web Computing
4. Multimedia Technologies
5. Research and Development

4.11 Content Distribution by Knowledge Area

Below is a summary of the distribution of the different course units in the different knowledge areas:-

- Multimedia Technologies (MT)
 - MIT 8116 Multimedia and Emerging Technologies

- IT Security (ITS)
 - MIT 7100 Information Security
 - MIT 7214 Audit and Security Assurance Principles
 - MIT 8100 Computer Security

- Internet and Web Computing (IWC)
 - MIT 7216 E-Service Delivery
 - MIT 7217 Web Design and Usability
 - MIT 8104 Online Information Services
 - MIT 8117 XML and Web Services
 - MIT 8118 Web based Information Systems and Web Mining

- IT Management (ITM)
 - MIS 7100 Systems Analysis and Design
 - MIS 7110 Database Systems
 - MIS 7111 Information Systems for Managers
 - MIT 7115 Contemporary Issues in Information Technology
 - MIS 7209 Project and Organization Change Management
 - MIT 7215 IT Strategic Planning and Management
 - MIT 8115 Corporate Network Management
 - MIS 8116 Enterprise Integration and Collaborative Communication

- Research and Development (RD)
 - MIT 7116 Research Methodology
 - MCS 7226 Seminar Series
 - MIT 7218 Legal & Ethical Aspects of Computing

5. The Curriculum for Master of Information Technology

SEMESTER I						
Code	Name	LH	PH	TH	CH	CU
MIT 7100	Information Security	45	-	-	45	3
MIS 7110	Database Systems	30	30	-	45	3
MIS 7100	Systems Analysis and Design	30	30	-	45	3
MIT 7115	Contemporary Issues in Information Technology	45	-	-	45	3
MIT 7116	Research Methodology	45	-	-	45	3
SEMESTER II						
MIT 7214	Audit and Security Assurance Principles	45	-	-	45	3
MIT 7215	IT Strategic Planning and Management	45	-	-	45	3
MIT 7216	E-Service delivery	45	-	-	45	3
MIT 7217	Web Design and Usability	30	30	-	45	3
MIS 7209	Project and Organization Change Management	45	-	-	45	3
MIT 7218	Legal & Ethical Aspects of Computing	45	-	-	45	3
MCS 7226	Seminar Series	-	60	-	30	2
SEMESTER III						
MIT 8104	Online Information Services	45	-	-	45	3
MIT 8110	Computer Security	45	-	-	45	3
MIT 8115	Corporate Network Management	45	-	-	45	3
MIT 8116	Multimedia and Emerging Technologies	45	-	-	45	3
MIT 8117	XML and Web Services	30	30	-	45	3
MIT 8118	Web based Information Systems and Web Mining Technology	30	30	-	45	3
MIS 7111	Information Systems for Managers	45	-	-	45	3
MIS 8116	Enterprise Integration and Collaborative Communication	45	-	-	45	3
MIT 8114	Masters Dissertation in IT	-	-	-	-	8
SEMESTER IV						
MIT 8204	Masters Project in IT	300	-	300	-	5

Under the Master of Information Technology Degree Programme, students will be allowed to major in one of the two following areas namely IT Management and Security Option and Internet and Web Computing Option. Each of these options is described as follows:

5.1. Course Options

5.1.1. Information Technology Management and Security Option

From the IT Management perspective, most managers feel that the critical asset that separates their organization from their competitors is the knowledge assets or intellectual capital of the employees of their organization. With many organizations rightsizing, outsourcing, and the like, the ability to capture, share, and apply the 'lessons learned' of the employees (especially those experts who retire or leave the firm) is critical to success and growth of the organization. Modern management requires an awareness of information technologies in order to remain competitive. Information systems influence the way in which the whole organization operates dealing with work practices, products, tools for decision support, marketing and sales, and many other areas of business, which are critical to the efficient running, and operation of any enterprise. On the other hand, the IT Security viewpoint emphasizes on the electronic handling of information as one of the defining technologies of our age. This means that the Information Security area addresses the rapidly growing global problems of maintaining and securing computer information. Enormous volumes of information are routinely stored and transmitted worldwide, indeed most aspects of our daily lives would come to a halt should the information infrastructure fail. However, with the benefits deriving from the ability to automatically manage so much information, they come with major threats to business, governments and individuals. The field of information security, namely the study of countermeasures to these real and serious threats has grown up rapidly in recent years. Important areas addressed include threats and vulnerabilities, cryptography, authentication and access control, security models, computer security, network security, fault detection, trusted computer systems, distributed systems security, World Wide Web security, applications security, and security management and policies.

Therefore the aim of the Information Technology Management and Security specialization is to prepare IT professionals for a position of responsibility in this demanding new world of IT management and security. The specific research areas of IT Management include IT Project Management; IT Strategic Planning; Information Management; Corporate Network Management; Information Security Management; Strategic Information Systems Management; Information Systems for Managers; Managing People in IT Environments; IT Architecture; Web-based Information Systems; and Web Mining Technologies. While the specific research areas for IT Security include information security policy, privacy and ethics; information security strategies and risk management; security assurance principles; encryption and authentication systems; information security management; computer information systems audit; computer security; network security; database security and secure computer systems.

5.1.2. Internet and Web Computing Option

This option entails two themes. The first theme focuses on internet and service delivery in which the foresight of information technology in governmental, public and private sectors online service delivery is described. The specific research areas in this theme include E-service Delivery; Online Information Services; Organizational Issues in IT; Web Design and Usability Issues; Internet Technologies; E-governance; E-Commerce; E-Business; Security, Risk Management and Control in E-Commerce. The second theme is on internet and web computing in which students will follow an in depth hands on approach to software-oriented Internet and web-based computing. The specific research areas include Internet Programming; Server-Side Development of E-Commerce Applications; Multi-Media and Immerging Technologies; Web Database Applications; Network and Distributed Systems Programming; Enterprise Wide Computing; and Interaction Design.

5.2. Master of Information Technology: IT Management and Security Option

5.2.1. Course outline for Plan A

Semester I (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores:- (5 core courses)						
MIT 7100	Information Security	45	-	-	45	3
MIS 7110	Database Systems	30	30	-	45	3
MIS 7100	Systems Analysis and Design	30	30	-	45	3
MIT 7115	Contemporary Issues in Information Technology	45	-	-	45	3
MIT 7116	Research Methodology	30	30	-	45	3
Total CU						15

Semester II (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (4 core courses)						
MIS 7209	Project & Organization Change Management	45	-	-	45	3
MIT 7214	Audit and Security Assurance Principles	45	-	-	45	3
MIT 7215	IT Strategic Planning and Management	45	-	-	45	3

MCS 7226	Seminar Series	-	60	-	30	2
Electives: - (1 elective course)						
MIT 7216	E-Service delivery	45	-	-	45	3
MIT 7217	Web Design and Usability	30	30	-	45	3
MIT 7218	Legal & Ethical Aspects of Computing	45	-	-	45	3
Total CU						14

Semesters III & IV (A Master's Dissertation)

Code	Name	LH	PH	TH	CH	CU
MIT 8114	Master's Dissertation in IT	-	300	-	-	10
Total CU						10

5.2.2. Course outline for Plan B

Semester I (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (5 core courses)						
MIT 7100	Information Security	45	-	-	45	3
MIS 7100	Systems Analysis and Design	45	-	-	45	3
MIS 7110	Database Systems	45	-	-	45	3
MIT 7115	Contemporary Issues in Information Technology	45	-	-	45	3
MIT 7116	Research Methodology	30	30	-	45	3
Total CU						15

Semester II (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (4 core courses)						
MIS 7209	Project & Organization Change Management	45	-	-	45	3

MIT 7214	Audit and Security Assurance Principles	45	-	-	45	3
MIT 7215	IT Strategic Planning and Management	45	-	-	45	3
MCS 7226	Seminar Series	-	60	-	30	2
Electives: - (1 elective course)						
MIT 7216	E-Service delivery	45	-	-	45	3
MIT 7217	Web Design and Usability	30	30	-	45	3
MIT 7218	Legal & Ethical Aspects of Computing	45	-	-	45	3
Total CU						14

Semester III (4 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (3 core courses)						
MIT 8110	Computer Security	45	-	-	45	3
MIS 7111	Information Systems for Managers	45	-	-	45	3
MIS 8116	Enterprise Integration and Collaborative Communication	45	-	-	45	3
Electives: - (1 elective course)						
MIT 8104	Online Information Services	45	-	-	45	3
MIT 8115	Corporate Network Management	45	-	-	45	3
MIT 8116	Multimedia and Emerging Technologies	45	-	-	45	3
Total CU						12

Semester IV (A Master's Project)

Code	Name	LH	PH	TH	CH	CU
MIT 8204	Masters Project in IT	-	300	-	-	5
Total CU						5

5.3. Master of Information Technology: Internet and Web Computing Option

5.3.1. Course outline for Plan A

Semester I (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (5 core courses)						
MIT 7100	Information Security	45	-	-	45	3
MIS 7100	Systems Analysis & Design	45	-	-	45	3
MIS 7110	Database Systems	30	30	-	45	3
MIT 7115	Contemporary Issues in Information Technology	45	-	-	45	3
MIT 7116	Research Methodology	30	30	-	45	3
Total CU						15

Semester II (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (4 core courses)						
MIS 7209	Project & Organization Change Management	45	-	-	45	3
MIT 7216	E-Service Delivery	45	-	-	45	3
MIT 7217	Web Design and Usability	30	-	-	45	3
MCS 7226	Seminar Series	-	60	-	30	2
Electives: - (1 elective course)						
MIT 7214	Audit and Security Assurance Principles	45	-	-	45	3
MIT 7215	IT Strategic Planning and Management	45	-	-	45	3
MIT 7218	Legal & Ethical Aspects of Computing	45	-	-	45	3
Total CU						14

Semester III & IV (A Master's Dissertation)

Code	Name	LH	PH	TH	CH	CU
MIT 8114	Masters Dissertation in IT	-	300	-	-	10
Total CU						10

5.3.2. Course outline for Plan B

Semester I (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores:- (5 core courses)						
MIT 7100	Information Security	45	-	-	45	3
MIS 7100	Systems Analysis & Design	45	-	-	45	3
MIS 7110	Database Systems	30	30	-	45	3
MIT 7115	Contemporary Issues in Information Technology	45	-	-	45	3
MIT 7116	Research Methodology	30	30	-	45	3
Total CU						15

Semester II (5 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores:- (4 core courses)						
MIS 7209	Project and Organization Change Management	45	-	-	45	3
MIT 7216	E-Service Delivery	45	-	-	45	3
MIT 7217	Web Design and Usability	30	-	-	45	3
MCS 7226	Seminar Series	-	60	-	30	2
Electives:- (1 elective course)						
MIT 7214	Audit and Security Assurance Principles	45	-	-	45	3
MIT 7215	IT Strategic Planning and Management	45	-	-	45	3
Total CU						14

Semester III (4 Courses)

Code	Name	LH	PH	TH	CH	CU
Cores: - (3 core courses)						
MIT 8116	Multimedia and Emerging Technologies	45	-	-	45	3
MIT 8117	XML and Web Services	30	30	-	45	3
MIT 8118	Web based Information Systems and Web Mining Technology	30	30	-	45	3
Electives: - (1 elective course)						
MIT 8104	Online Information Services	45	-	-	45	3
MIT 8110	Computer Security	45	-	-	45	3
MIS 7111	Information Systems for Managers	45	-	-	45	3
Total CU						12

Semester IV (A Master's Project)

Code	Name	LH	PH	TH	CH	CU
MIT 8204	Masters Project in IT	-	300	-	-	5
Total CU						5

6. Detailed Curriculum

6.1. Semester I

MIT 7100 Information Security (3 CU)

- (a) **Course Description:** This course unit addresses the issues and problems involved in securing information and services provided via the Internet with particular reference to the World Wide Web. It exposes students from a variety of backgrounds, to the technical aspects of information confidentiality, integrity, availability; authentication models; protection models; security kernels; secure programming; audit; intrusion detection and response; operational security issues; physical security issues; personnel security; policy formation and enforcement; access controls; information flow; legal and social issues; identification and authentication in local and distributed systems; classification and trust

modeling; risk assessment.

- (b) **Aims:** The course aims to introduce students to the issues of Information Security, countermeasures to the threat of information infrastructure and failure to ensure the security of electronic information. It embraces a range of technologies such as cryptography, computer security, and fraud detection, and also includes the study of how security can best be managed. The program also aims to introduce the technical, legal and commercial aspects of Information Security. Students are from a variety of backgrounds, ranging from new graduates through to senior security managers in enterprises seeking a formal qualification in Information Security.
- (c) **Learning outcomes:** At the end of this course unit, the students will be able to demonstrate understanding of the principles and practice associated with:
- Cryptography: Cipher methods, Single key vs. Public Key, Role of security, and Types of security, trust, security, vulnerability, safeguard and countermeasures.
 - Access Control Matrix Model; Protection Models; Policy formation
 - Authentication and Identity, Secure design principles, Network Security, Interception and denial of communications, Distributed authentication issues, Firewalls
 - Security Evaluation and Audit
 - Malicious Code: Viruses, Worms, Misuse and intrusion detection
 - Distributed attacks and defenses
 - Vulnerability Analysis, Cyber law, security Forensics
 - Physical threats, operational security, Legal and Societal Issues
 - Managing a secure environment
- (d) **Teaching and Learning Pattern:** The teaching and learning approaches will combine classroom lectures, discussions and group activities, quizzes and take home assignments. A group project shall form part of the coursework. The material presented in class will overlap that of the text but will contain additions and variations
- (e) **Indicative Content:** This course unit addresses the issues and problems involved in securing information and services provided via the Internet with particular reference to the World Wide Web. It exposes students from a variety of backgrounds, to the technical aspects of information confidentiality, integrity, availability; authentication models; protection models; security kernels; secure programming; audit; intrusion detection and response; operational security issues; physical security issues; personnel security; policy formation and enforcement; access controls; information flow; legal and social issues; identification and authentication in local and distributed systems; classification and trust modeling; risk assessment.

(f) **Assessment Method:**

- Coursework = 40% consisting of:
 - Two written tests
 - Group project (with practical laboratory work involving creation of interactive www pages)
 - One take home individual assignment (journal literature)
- Final written examinations (3 hours) = 60%

(g) **Reference books**

- (i) Mathew Bishop, Computer Security: Art and Sciences, Addison Wesley, 2003. ISBN 0-201-44099-7.
- (ii) Charles P. Pfleeger and Shari Lawrence. Security in Computing, Prentice Hall, 2003.

MIS 7100 Systems Analysis and Design (3 CU)

(a) **Course Description:** Use management information systems techniques to solve managerial and organizational problems of limited complexity. Includes solving formal analytic problems and implementing solutions using MIS development techniques.

(b) **Aims:** The course focuses on the following aspects of Information System Development:

- Study, Analysis and Design of a System
- Documenting and evaluating the System.
- Data Modeling.
- Developing Information Management System for an Organization.
- Implementing and Testing

(c) **Learning Outcomes:** On completion of this course unit, the students will be able to:

- Understand the requirements, carry out system study and analyze information.
- Document and evaluate a System.
- Develop an Information Management System for an Organization.
- Implement and Test the system

(d) **Teaching and Learning pattern:** The course will be delivered using lectures, tutorial/practical sessions as well as demonstrations. Individual and group-based tutorials and a Wide range of computer-based learning and other tools will be used to support the

student's learning process, including use of real life case studies.

(e) Indicative content:

- Introduction: System Definition and Concepts: General Theory systems, Manual and automated systems, Real-life Business Sub-systems. System Environments and Boundaries. Real-time and distributed systems. Basic principles of successful systems. Approach to system development: Structured System Analysis and Design, Prototype, Joint Application Development.
- Systems Analyst: Role and Need of Systems Analyst. Qualifications and responsibilities. System Analysis as a Profession
- System Development Cycle: Introduction to Systems Development Life Cycle (SDLC). Various phases of SDLC: Study, Design, Development, Implementation, Maintenance. System documentation consideration: Principles of Systems Documentation, Types of documentation and their importance, Enforcing documentation discipline in an organization
- System Planning: Data and fact gathering techniques: Interviews, Group Communication - Questionnaires, Presentation and Site Visits. Assessing Project Feasibility: Technical, Operational, Economic, Cost Benefits Analysis, Schedule, Legal and contractual, Political. Modern Methods for determining system requirements: Joint Application, Development Program, Prototyping, Business Process Re-engineering. System Selection Plan and Proposal.
- Modular and Structured Design: Module specifications, Top-down and bottom-up design. Module coupling and cohesion. Structure Charts.
- System Design and Modeling: Process Modeling, Logical and physical design, Conceptual Data Modeling: Entity-Relationship Analysis, Entity-Relationship Modeling, ERDs and DFDs, Concepts of Normalization. Process Description: Structured English, Decision Tree, Decision Tables. Documentation: Data Dictionary, Recording Data Descriptions
- Input and Output: Classification of forms, Input/Output forms design. User-interface design, Graphical interfaces. Standards and guidelines for GUI design. Designing Physical Files and Databases: Designing Fields, Designing Physical Records, Designing Physical Files, Designing Databases. Introduction to CASE Tools, Features, Advantages and Limitations of CASE Tools, Awareness about some commercial CASE Tools
- System Implementation and Maintenance: Planning considerations. Conversion methods, procedures and controls. System acceptance criteria. System Evaluation and Performance. Testing and Validation. Preparing User Manual. Maintenance Activities and Issues
- Computer System Audit and Security: Audit of Computer System Usage. Types of Threats to Computer System and Control Measures: Threat and Risk Analysis, Disaster Recovery and Contingency Planning, Viruses.

- OO Analysis/Design: Introduction to UML. OO Development Life Cycle and Modeling. Static and dynamic modeling. Comparison of OO and Module-oriented Approach. Modelling using UML
- (f) **Assessment method:** The assessment will be in form of tests and assignments (40%) and final written exam (60%)
- (g) **Reference Books:**
- (i) Modern Systems Analysis and Design, Second Edition, 2000, Joey George and Joseph Valacich Pearson Education. J. Hoffer
 - (ii) Systems Analysis and Design, First Edition, 2002, John Wiley & Sons, Inc. A. Dennis and B.H. Wixom
 - (iii) Systems Analysis and Design Methods, First Edition, 2000, Tata McGraw-Hill. J. Whitten, L. Bentley and K. Dittman
 - (iv) Management Information Systems, Seventh Edition, 2002, Pearson Education. K.C. Laudon and J.P. Laudon

MIS 7110 Database Systems (3 CU)

- (a) **Course Description:** The concepts, principles, issues and techniques for managing corporate data resources of various types. Techniques for managing the design and development of large database systems including logical data models, concurrent processing, data retrieval, data distribution, and database administration.
- (b) **Aims:** This course provides an understanding of the issues in managing database systems as an essential organizational resource. Students learn enterprise data architecture components, data storage configurations, and information retrieval methods. The course proceeds from the relational model to the multidimensional model, object-relational techniques, and web accessed data.
- (c) **Learning outcomes:** On completion of this course unit, the students will be able to:
- Demonstrate an understanding of the issues in managing database systems as an essential organizational resource. Students learn enterprise data architecture components, data storage configurations, and information retrieval methods.
 - Design, build and implement a database, exercise the database built under various conditions, query the database using SQL and use SQL to demonstrate implementation problems
 - Evaluate file storage and transfer methods, Sort and merge files

- Demonstrate advancement from the relational model to the multidimensional model, object-relational techniques, and web accessed data.

(d) Teaching and learning pattern: Suggested pedagogical approaches to delivering the course:

- Case discussions to demonstrate management issues
- Lectures
- Team projects
- In-class student presentations

(e) Indicative content:

- The variety and complexity of current data management systems and evolving data management technology
- Enterprise data architecture components and data requirements
- The entity relationship model and Normalization
- Comparison of normalized and de-normalized models
- Relational integrity and concurrency control
- Limitations inherent in the relational model and possible solutions including object-oriented databases, object-relational databases, and multidimensional databases.
- Large text files, multi-media and embedded information needed for a complete information set
- Retrieving information using SQL and other methods
- Overview of database security, maintenance, recovery and tuning

(f) Assessment method: The assessment will be in form of tests and assignments & database system project (40%) and final written exam (60%)

(g) Reference Books:

- (i) Connolly, T., Begg, C. E., Holowczak, R. (2007). Business Database Systems. (2007). Publisher: Addison Wesley.
- (ii) Beynon-Davies, P. (2003). Database Systems. Publisher: Palgrave Macmillan; 3rd revised edition.

MIT 7115 Contemporary Issues in Information Technology (3 CU)

(a) Course Description: This course will provide an in-depth study of one or more, recent,

emerging or potential important developments in IT that impact on forecasting, IT policy, global organizations and distributive computing, the role and responsibilities of the Chief Information Officer. IT and business strategies.

(b) **Aims:** This course aims at:

- Presenting and evaluating the most recent applications of IT e.g. the Internet, IT economy, online business, telecommuting etc.
- Reviewing an in-depth analysis of the changing force IT imposes upon people businesses and social organizations.

(c) **Learning outcomes:** At the conclusion of this Unit, students will be able to:

- Demonstrate in-depth knowledge on contemporary computer-based technologies being used by different types of people for different applications.
- Understand why certain types of people use overuse or refuse IT.
- Analyze the role IT plays in industry and envisage its changing force in creating new ways of conducting business.
- Analyze the role IT plays in the home and envisage its changing force in creating the home of the future.
- Demonstrate in-depth knowledge on the so-called e-boom and online activities such as telecommuting, online shopping, online banking, entertainment, communications, ecommerce and the like.
- Analyze and understand the implications of IT in creating new concepts for human communities (virtual communities) and human inter-relationships (impersonal relationships).

(d) **Teaching and Learning pattern:** Course delivery will be in form of lectures and tutorials.

(e) **Indicative content:** This course will take a look at the rise of IT in the late twentieth century and its role in the third millennium, philosophical issues and perspectives on IT analysis of the utilization of IT, IT hazards, IT and business today including online banking, ecommerce, e-transactions etc.

(f) **Assessment method:** final written examination (40%) Assessment will be in form of at least one (practical) assignment and one test 30%, A practical exam (4 hours open book) - (30%) and a final written examination (40%)

(g) **Reference Books:**

- (i) De Palma, P, (2004), Computers in Society, McGraw Hill.

- (ii) Easton, A. (2004), Taking Sides: Science, Technology and Society, McGraw Hill
- (iii) Arterton, F. C. (1997). Teledemocracy: Can Technology Protect Democracy. Sage Publications
- (iv) Baudrillard, J. (1997). The Consumer Society: Myths and Structures. Sage Publications
- (v) Blackler, F., & Osborne, D (1987). Information Technology and People. The MIT Press
- (vi) Dunlop, C., & Kling, R. (1991). Computerization and Controversy. Academic Press.
- (vii) Einon et al (1995). Information Technology and Society, SAGE Publications.
- (viii) Feenberg, A. (1991). Critical Theory of Technology, Oxford University Press.
- (ix) Finholt, T., & Huff, C. (1994). Social Issues in Computing: Putting Computing in Its Place. NY, McGraw-Hill.

MIT 7116 Research Methodology (3CU)

- (a) **Course Description:** In this course, guidance will be given to students on how to identify a research problem. Instructions will be provided which will enable students to perform effective literature reviews. Students will be presented with various research paradigms and models of methodology and assist with designing an appropriate method for their research. Students will be trained in the analysis and presentation of results, exposition of processes and methods used and conclusions drawn. Guidelines outlining the preparation and writing of a research dissertation and or a project will be provided at the conclusion of the course.
- (b) **Aims:** The aims of the course are:
 - To provide students with a firm foundation/underpinnings of research from which they can undertake a research problem
 - To provide students with a number of separate, but related practical skills associated with the research process
- (c) **Learning outcomes:** At the end of this course unit, the students will be able to identify the aims of the research, selection of appropriate methodological approach, selection of implementation methods, data collection and analysis techniques and its interpretation, and how all this fits within the literature. In other words, the students will produce a research proposal as a blue print for the whole research dissertation and or project.
- (d) **Teaching and Learning Pattern:** Lectures will be given through out the semester. Group work and discussions to perform literature reviews will be done to enable understanding and application of concepts. This will involve identification and reading material which includes journal papers to be distributed to students a week in advance. The lecturer

addresses questions to the students to encourage them to think about and understand the material. The students will identify researchable problems from which they will apply the concepts taught in class with an aim of producing research/project proposals by the end of the semester. The students will be required to build on their proposals on a weekly basis in line with the new concepts that will be taught. The students will make presentations of their draft proposal for critique and feedback from both the students and the lecturer.

(e) **Indicative Content:** The course will cover the following topics:

- Definition of Research Methodology
- Research Paradigms in Computing and Information Systems
- Research Planning and Management
- Types of Research Methods
- Scientific writing including abstracts; identifying research problems, research objectives and questions; Interpretation of technical literature (literature reviews); Selection of overall methodological approach; Selection of suitable data collection and analysis techniques; Interpretation and conclusion of the research; and Presentation of research findings.
- Research Ethics/Plagiarism

(f) **Assessment Method:** Assessment will be categorized as follows:

- Progressive assessment 40%
 - Group work (literature reviews) 20%
 - Presentation (skills) 10%
 - Theory and application (concepts) 10%
- Final written Exam 60%
 - Individual work (scientific writing and research paper) 40%
 - Theory and application (concepts) 20%

(g) **Reference books**

- (iii) Practical Research: Planning and Design (March 2004): Paul D. Leedy, Jeanne E. Ormrod, Jeanne Ellis Ormrod, Paperback, Prentice Hall
- (iv) Graduate research: A guide for Students in the sciences (May 1998): Robert V. Smith, Paperback, University of Washington
- (v) Research Methods: A process of Inquiry ((May 2006)): Anthony M. Graziano, Michael L. Raulin, Hardcover, Prentice Hall
- (vi) Introduction to qualitative research methods: A guidebook and resource (1998): Taylor, Steven J.; Bogdan, Robert, Hoboken, (3rd Ed.) NJ, US: John Wiley & Sons Inc.

6.2. Semester II

MIS 7209 Project and Organization Change Management (3 CU)

- (a) **Course Description:** This course deals with managing projects within an organizational context, including the processes related to initiating, planning, executing, controlling, reporting, and closing a project. Project integration, scope, time, cost, quality control, and risk management, Software size and cost estimation are also introduced in this course. Additionally, assigning work to programmer and other teams, monitoring progress, Version control is introduced to the students. With respect to the Organization change, students are taught how to manage the organizational change process, identify project champions, working with user teams, training, and documentation. More so, the change management role of the IS specialist and the use of sourcing and external procurement; contracts and managing partner relationships is also taught to the students.
- (b) **Aims:** The course aims at providing students with the ability to develop detailed project plans, schedules, and budgets; estimate project resources; allocate/coordinate resources; and interface with management. They are expected to learn tools and techniques of project planning and management, including the use of project management software. The course develops skills in the human and organizational implications of change including understanding the organizational change process; identifying stakeholders; assessing potential impacts of projects; and overcoming resistance, politics, and other human issues.
- (c) **Learning Outcomes:** Upon completion of the course the students should be able to:
- Develop detailed project plans, schedules, and budgets
 - Estimate project resources; allocate/coordinate resources; and interface with management.
 - Use tools and techniques of project planning and management, including the use of project management software.
 - Have skills in the human and organizational implications of change including understanding the organizational change process; identifying stakeholders;
 - Assess potential impacts of projects; and overcome resistance, politics, and other human issues.
- (d) **Teaching and learning pattern:** Teaching will be in terms of lectures, case studies and group work
- (e) **Indicative content:**
- a) Managing software / technology projects:

- Project lifecycle, Project stakeholders, Project management skills (leading, communicating, negotiating, influencing, and presenting)
 - Project planning (definition, scope, schedule, costs, quality, resources, and risks)
 - Estimating software size and cost.
 - Software work module design, assignment, and control.
 - Role of repository, project library, and version control.
 - Contingency planning
 - Project reporting and controls (definition, scope, schedule, costs, quality, resources, and risks),
 - Testing and testing plans; alpha and beta.
- b) Managing organization change:
- The role of IS specialists as change agents, Envision change and the change process, Diagnose and conceptualize change
 - Deal with the challenges of implementation and understand and cope with resistance
 - Deal with issues of motivation, interpersonal relations, group/team dynamics, and leadership in the change process; implications of cross-organization and international teams.
 - Manage organizational politics
 - The limitations of projects as organizational change initiatives
 - Organizational influences on project success (culture, organizational structure, rewards, and measures)
 - Software project management resources and professional development such as SMI and PMI.
 - Additional activities required to ensure the success of IT projects (training, job redesign, communication, etc.)
 - Manage sourcing partners as well as define contract and relationships
 - Hands-on experience using project management software (e.g., Microsoft Project).
- (f) Assessment method: The assessment will be in form of tests and assignments (40%) and final written exam (60%)
- (g) Reference Books:
- (i) A Guide to the Project Management Book of Knowledge by the Project Management Institute, IEEE Std 90-2003.
 - (ii) Project management for information systems, Edited by James Cadle and Donald Yeates, Prentice Hall, 2001
 - (iii) Breakthrough technology project management, Bennet P. Lientz, Academic Press, 2001.
 - (iv) The project manager's desk reference: a comprehensive guide to project planning, scheduling, evaluation, and systems, James P. Lewis, McGraw-Hill, 2000.

- (v) Project management for business and technology: principles and practice, John M. Nicholas, Prentice Hall, 2001.

MIT 7214 Audit and Security Assurance Principles (3 CU)

- (a) **Course Description:** This course will offer the students a holistic overview to audit and security assurance issues pertinent in an enterprise. The course will specifically tackle Security mechanisms, Operational issues, Policy, Attacks, Information Systems Audit, Data Center Audit, topics in Computer Audit etc. Security Domains, Forensics, Information States, Security Services, Threat analysis model, Vulnerabilities and other security issues will also be looked at.
- (b) **Aims:** The course aims at:
- Introducing students to the concepts of Information Assurance and how to secure such information using appropriate systems and technologies.
 - Presenting introductory aspects on computer audit including auditing information systems, auditing computerized systems, auditing applications etc.
- (c) **Learning Outcomes:** On completion of this course unit, the students will:
- Have a firm grasp of the concepts related to Information Assurance and be able to articulate the salient principles about Information Assurance that derive from the concepts.
 - Be able to advice enterprises on the appropriate interventions to take as regards audit and assurance in the enterprise.
- (d) **Teaching and learning pattern:** Course delivery will be in form of lectures and tutorials (including relevant scenarios in the enterprise)
- (e) **Indicative content:**
- Security mechanisms
 - Operational issues
 - Policy
 - Attacks
 - Security Domains
 - Forensics
 - Information States
 - Security Services

- Cryptographic protocols
 - Audit of Computer Systems
 - Applications, Business Security and Control
- (f) **Assessment method:** The course will be assessed by course work and tests (40%) and final examination (60%)
- (g) **Reference Books:**
- (i) Computer Security Lab Manual (Information Assurance & Security) by Vincent Nestler, Wm. Arthur Conklin, Gregory White and Matthew Hirsch Publisher: Career Education 2005.
 - (ii) Security in Computing, 4th Edition by Charles P. Pfleeger and Shari Lawrence Pfleeger. Publisher: Prentice Hall 2006.

MIT 7215 IT Strategic Planning and Management (3 CU)

- (a) **Course Description:** This course addresses the ways in which the managers use modern business information systems and networks to enhance the management process and promote business outcomes. Building on core concepts of the role and function of information systems in the organization, the course focuses on the key areas of management decision making related to investment in and strategic management of information technology resources. The impact of digital networks and communications technology on modern business activities and strategies is a core theme of the course.
- (b) **Aims:** A student that undertakes this course should be able to understand:
- Concepts relating to the role and function of networked business information systems, and the typical applications found in the modern organization;
 - Typical activities and decisions involved in the acquisition and/ or development and management of networked business information systems and their impact on organizations;
 - Be able to understand information systems and eBusiness strategy ;
 - Be able to understand the development and use of networked business information systems in the context of promoting overall business objectives, and the place of information technology management within the organization;
 - Be able to understand how networked business information system activities are led and managed in the context of the intersecting interests of business executives, IT executives, partner organizations, and IT users.
- (c) **Teaching and learning pattern:** This will include lectures and tutorials

(d) **Learning outcomes:** Upon successful completion of the course the student will reliably demonstrate the ability to:

- explain the role of, and comment on a range of modern business applications;
- survey the range of activities involved in, and decisions related to, the acquisition and/or development of a business information system;
- comment critically on information systems and eBusiness strategy;
- appreciate the effective use of communications and information technology;
- present a rationale for decision-making around the strategic use of networked business information systems using appropriate supporting data

(e) **Indicative content:**

- Understanding information, its management, and the history of IT
- The role and importance of BIS and IT management in the enterprise.
- Where does BIS management fit in the organization and what kinds of leaders are needed?
- IT processes in the organization
- Planning-related IT processes
- Managing the essential technologies in the digital economy
- Methods of acquiring information systems
- Systems development life cycle
- Initiating systems development
- Systems analysis and design
- Information technology project management
- Outsourcing and vendor management
- Managing information security
- Systems for supporting decision-making, collaboration and knowledge work
- IT planning, strategy and strategic alignment
- Assessing the value of IT
- The future of IT in the enterprise: commodity or business driver?
- E-Business: technologies and business models
- E-business strategy
- Defining strategic direction in eBusiness
- Managing emerging technologies

(f) **Assessment method:** The assessment will be done by tests and take home assignments (40%), and written examination (60%)

(g) **Reference Books:**

- (i) McNurlin, Barbara C., Ralph Sprague and Tung Bui. 2008. Information Systems Management in Practice. 8th Edition. Prentice Hall. ISBN: 0132437155
- (ii) Afuah, Alan and Tucci Christopher L. (2003). Internet Business Models and Strategies:

- Text and Cases. 2nd ed. McGraw Hill, New York. (Chapter 11, pp. 203 – 223)
- (iii) Bocij, Paul et al. (2005) Business Information Systems: Technology, Development and Management for the e-business. 3rd Edition. Financial Times / Prentice Hall.

MIT 7216 E-Service Delivery (3 CU)

- (a) **Course Description:** The course begins by looking the definitions of e-governance and e-government. The course then introduces policy and management issues specific to e-governance. The course seeks to introduce students to topics salient to effective governmental adoption and implementation of initiatives mediated by the Internet, including e-procurement, e-licensing, online citizen access to governmental databases, and e-democracy initiatives, both in terms of prerequisites to successful implementation and in terms of organizational and social impacts of these initiatives. Core questions addressed in the course include what government functions are best implemented through e-government methods, how e-government initiatives may be evaluated to assess effectiveness, what exemplary practices might improve e-government effectiveness, what the sociopolitical implications of e-governance are, and how the training of public administrators must change given new roles emerging due to the rise of e-governance.
- (b) **Aims:** The course aims to provide basic knowledge on the delivery of Electronic Services and its importance to society. In particular, it examines the basics of e-governance; e-governance laws and policies; and different kinds of e-services delivered by governments. In addition, models of best practices in e-service delivery will be taught. Specific objectives of the course are to:
- provide knowledge and understanding of existing and emerging Electronic Services;
 - provide knowledge and understanding of possible innovations in public administration through Electronic Services delivery;
 - develop skills of the effective use of Electronic Services as citizens; and
 - help graduate students to choose topics for their future Masters Projects and dissertations.
- (c) **Learning Outcomes:** Upon successful completion of this course, the student should be able to:
- Have knowledge and understanding of
 - Electronic Services and its importance to society;

- basics of E-governance and its laws and policies;
 - models of best practices in e-service delivery
 - possible innovations in public administration through E-services delivery
 - Develop skills of the effective use of Electronic Services as citizens
- (d) **Teaching and Learning pattern:** Since this course is supposed to have only lecture hours, it will form mostly the theoretical knowledge. To provide students with practical skills, they will be given individual and group assignments to be done as a form of extracurricular activity.
- (e) **Indicative content:** E-governance; E-government. Policy and management issues specific to E-governance; Effective governmental adoption; E-government initiatives: E-procurement; E-licensing; online citizen access to governmental databases; E-democracy initiatives. Successful implementation of E-government initiatives; Organizational, social and political impacts of E-government initiatives. E-government functions. E-government methods; E-government effectiveness evaluation and improvement; and Training of public administrators on E-governance.
- (f) **Assessment method:** Assessment will be in terms of tests and coursework (40%) and a final examination (60%)
- (g) **Reference books:**
- (i) Lamersdorf, W., Tschammer, V. & Amarger, S. (2004). Building the E-Service Society: E-Commerce, E-Business and E-Government. Kluwer Academic Publishers
 - (ii) Malkia, M., Savolainen, R., Anttiroiko, A.-V. (2003). E-Transformation in Governance: New Directions in Government and Politics. Idea Group Publishing.
 - (iii) Pavlichev, A., Garson, G.D. (2003). Digital Government: Principles and Best Practices. Idea Group Publishing.
 - (iv) Gronlund, A. (2002). Electronic Government: Design, Applications and Management. Idea Group Publishing.
 - (v) Curtain, G.G., Sommer M.H., Vis-Sommer, V. (2004). The World of E-Government. Haworth Press, 2004
 - (vi) Huang, W., Siau, K., Wei, K.K. (2005). Electronic Government Strategies and Implementation. Idea Group Publishing
 - (vii) Dunleavy, P., Margetts, et al. (2006). Digital Era Governance: IT Corporations, the State,

and e-Government. Oxford University Press.

(viii) Curtain, G. G. et al. (2004). The World of E-Government. Haworth Press.

MIT 7217 Web Design and Usability (3 CU)

(a) **Course Description:** This course provides students with non-IT educational background with necessary knowledge of core principles and technologies of Web design. Topics covered in this course include fundamental principles of Web design such as information architecture, page layout, color principles, style consistency, use of multimedia. Overview of Web technologies is dealt with markup languages (HTML, XHTML, XML), Style Sheet Languages (CSS, XSL), client-side scripting (JavaScript, VB Script), service-side scripting (PHP, ASP) and multimedia technologies (Flash). Other topics focus on practical issues of building effective Web sites in terms of enhancing their usability.

Students will be given individual and group assignments to form practical skills.

(b) **Aims:** This course aims to provide students with non-IT educational background with necessary knowledge of core principles and technologies of Web design. Those students who already studied Web technologies being at the bachelor's level this course helps to systemize their knowledge before taking further courses like XML and Web Services etc.

(c) **Learning outcomes:** On completion of this course unit, the students will be able to have:

- Knowledge and understanding of:
 - fundamental principles of Web design
 - main Web technologies
- Practical skills of;
 - using principles of Web design
 - Web technologies
 - building effective (usable) Web sites

(d) **Teaching and learning pattern:** Since this course is supposed to have both lecture and practical hours, it will form the theoretical knowledge as far as practical skills is concerned. To provide students with practical skills, they will be given individual and group assignments to be done within practical and extracurricular hours.

(e) **Indicative content:** Fundamental principles of Web design: Information architecture; Page layout. Color principles; Style consistency; and Use of multimedia; Overview of Web technologies: Markup languages (HTML, XHTML, XML); Style Sheet Languages (CSS, XSL); Client-side scripting (JavaScript, VB Script); service-side scripting (PHP, ASP); Multimedia technologies (Flash); and Building effective Web sites in terms of enhancing their usability.

(f) **Assessment method:** Course work which will consist of tests or take home assignment as well as practical projections will contribute 40% (Test I: 15%, Test II: 15%, Assignment: 10%) of final mark. While an end of semester exam will contribute the remaining 60 %

(g) **Reference Books:**

(i) Fowler, S., Stanvik V. (2003). Web Application Design Handbook: Best Practices for Web-Based Software. Elsevier Inc, Morgan Kaufmann Publishers, San Francisco. ISBN: 1-55860-752-8

(ii) Brink, T., Gergle, D. & Wood, S. (2003) Usability for the Web: Designing Web Sites that Work. Morgan Kaufmann Publishers, San Francisco

(iii) Spool, J. M., Scanlon, T. et al. (2003) Web Site Usability: A Designer's Guide. Morgan Kaufmann Publishers, San Francisco

(iv) Johnson, J. (2003). Web Bloopers: 60 Common Web Design Mistakes, and How to Avoid Them. Morgan Kaufmann Publishers, San Francisco

(v) Yuen, P.K., Lan, V. (2003). Practical Web Technologies. Pearson Education Ltd. ISBN 0201 750767

(vi) Welling, L., Thomsen, L. (2005). PHP and MySQL Web Development (Third Edition). Sams Publishing ISBN 0-672-32672

MIT 7218 Legal and Ethical Aspects of Computing (3CU)

(a) **Course Description:** The course focuses on issues that involve computer impact on society and related concerns. The students will be taught issues on: Transitional data flow; copyright protection; Information as a source of economic power; rights to access computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing; current and anticipated uses of computer prediction. The course will also examine and evaluate the meaning of ethics and

professional conduct including the protection of personal ethical concerns. The students will also be exposed to the status of the regulation and emerging markets.

(b) **Aims:** This course aims at providing students with:

- A good grounding in social, legal, ethical and management issues affecting their probable role as researchers and or working computer scientists, practitioners or engineers in Computing and Information Technology-related disciplines.
- The basic background to develop their professional role in the workplace, beyond simply performing technical tasks assigned to them.

(c) **Learning outcomes:** Upon successful completion of this course, the students will:

- Apply the ethical concepts relevant to resolving moral issues in business, industry, and other relevant areas of concern;
- Articulate and defend with good reasons his/her own ethical point of view pertaining to specific problem areas in business, industry, and related areas;
- Analyze business plans, working procedures and policies in terms of current legislative and case law;
- Evaluate proposed and actual changes in the law for their effect on their working and personal environments in terms of rights, liabilities and responsibilities; Present compelling arguments about the social impact of new technological developments; and
- In addition, students should be able to maintain and develop their awareness of the social, legal and ethical framework in which they find themselves, through knowledge of the underlying mechanisms of change in these areas.

(d) **Teaching and Learning Pattern:** The course will primarily be taught by external seminar speakers (i.e. professionals in the field of IT and Law related disciplines) and directed reading (from internet resources and text books as seen in the reading list). Also interactive lectures i.e. presenting a topic to the class and giving a starting point from which the students can give their own ideas will be used in learning this course. Strong encouragement will be given for students to continue these discussions outside lectures both in person and using online discussion tools such as MUELE (Makerere University Elearning). Current IT-related legislation and case law will be taught by direct lectures, supported by directed reading. Assignments with strong formative aspects (requiring self-directed research on a topic) will support each of the sections of the course.

(e) **Indicative Content:** The course will cover the following topics:

- Nature of ethics, ethical development, responsibilities and basic ethical directions
- Ethical principles, values, and their foundations

- Specific computing and information technology related business, industry, and engineering ethical issues
 - Social impact of technological change: Internet communications; medical technologies; bio-engineering; education; entertainment; industry, commerce and working practices; globalization; public misunderstanding of science; environmental impact of high technology
 - National and international legal frameworks; specific legislation and case law involving IT issues
 - Domain Names; IP law; Data Protection; Computer misuse; Software Licensing, Transitional data flow; copyright protection; Information as a source of economic power; rights to access computer systems; computer crime; data privacy; establishing national priorities in the technical and social aspects of computing
- (f) **Assessment Method:** Assessment will be made up of coursework (40%) and a final written exam (60%). Coursework will entail four parts:
- A portfolio or similar on social issues (10%);
 - An essay on a legal question (10%);
 - Individual questions from the external speakers requiring short answers (10%);
 - In-depth concise online discussions on legal and social issues (10%)
- (g) **Reference books**
- (i.) Computer Ethics: Integrating Across the Curriculum by Marion Ben-Jacob, Mercy College, ISBN-13: 9780763778095, ISBN-10: 0763778095, Cd-rom, 2010
 - (ii) Pandora's Box: Social and Professional Issues of the Information Age by Andrew A. Adams and Rachel McCrindle (Paperback - 14 Dec 2007)
 - (iii) Engineering Ethics by Charles B. Fleddermann, 1st edition Prentice Hall, 1999. ISBN 13: 9780137842247
 - (iv) Engineering, Business and Professional Ethics by Moodley, Krisen, Elsevier Science & Technology 2007, ISBN-13: 9780750667418

MCS 7226: Seminar Series (2CU)

- (a) **Course Description:** The course helps students to strengthen their ability to do guided research, make a report on technical issues and present these issues in a scientific set up. While lecturers will give the students guidelines on the topics to research on, they will not formally teach them in class. However, what is expected out of the students will be explicitly given to them and examined.
- (b) **Aims:** The aims of the course are:
- To develop the students' ability to search for and internalize scientific academic material;
 - To develop the student's skills in technical writing; and

- To develop the student's presentation skills.
- (c) **Learning outcomes:** At the end of this course unit, the students should be able to:
- Read and internalize scientific academic material in his/her area of study;
 - Adequately and competently report academic findings in technical documents (reports, articles, etc);
 - Prepare good presentations for dissemination of scientific findings; and competently present scientific findings.
- (d) **Teaching and Learning Pattern:** Students will be given broad areas of study together with research questions to address by the beginning of the second semester. Each student will be given a senior staff from whom they can get advice and guidance whenever necessary. The student will then be required to address one research problem and make a write up on it. The student will then be required to present his work to the staff and his/her peers. As part of the course, the student will also be obliged to attend all (weekly) research talks in the faculty (for the entire second semester).
- (e) **Indicative Content:** The content is both in terms of skill and technical content.
- Technical content: This depends on the problem addressed. The student is expected to show understanding and comprehension of the subject matter.
 - Skill content: a student is expected to show ability to comprehend scientific literature, correctly make a technical report and competently prepare and make an academic presentation.
- (f) **Assessment Method:** Assessment will be made up of 4 parts:
- Attendance of weekly research talks (Semester 2) 10\%
 - Report writes up 50\%
 - Presentation 20\%
 - Knowledge of subject matter 20\%
- (g) **Reference books:** The textbooks and articles will depend on the problem being addressed.

6.3. Semester III

MIS 7111 Information Systems for Managers (3 CU)

- a) **Course Description:** There are several trends occurring in the world today, among many is the movement to computer based information systems. Managers need to be informed about the trends in information systems and hence participate fully in its development and management. This course studies the range of information systems needed to provide support for management in decision-making, planning and control. The starting point, therefore, is the

set of potential managerial problems and opportunities, and the associated information requirements. Organizational diagnostics are considered for problem/opportunity identification. Solution approaches are developed and used as the basis for describing the structure, characteristics and management of generic categories of systems such as Decision Support Systems (DSS), Executive Information Systems (EIS) and Expert Systems (ES).

- b) **Aims:** This course provides an enables students to identify information systems needs and participate in its development in order to create a business competitive advantage. It facilitates students to become aware of the benefits and limitations of different kinds of computer-based IS commonly used in business, such as database management systems, decision support and executive information systems, and expert systems. Students are able to gain a sophisticated awareness of the rich variety of managerial issues raised by information systems and information literacy by attending to the managerial ramifications of selected additional topics, such as the utilization of information systems for competitive advantage; technologies (hardware, software, network technologies); outsourcing; and the process of systems development (building an IS).
- c) **Learning outcomes:** At the end of the course the students should be able to:
- Define different types of information systems and their role in today's competitive business environment.
 - Address what an information system is. What managers need to know about information systems,
 - How information systems transform organizations and management. How the Internet and Internet technology has transformed business.
 - The major management challenges in building and using information systems?
 - Participate in structured information systems developments as a knowledgeable person from planning, feasibility study, information requirement analysis, design, implement, maintain, and evaluate. Identify other information systems development, their advantages and Disadvantages, when they are appropriate and when they should not be used
- d) **Teaching and learning patterns:** Suggested pedagogical approaches to delivering the course include: Case discussions to demonstrate management issues; Lectures; Team projects; and In-class student presentations
- e) **Indicative content:**
- Introduction to Information Systems: Definitions, Types, Basic features, Examples of modern Information systems. Transaction Information systems, Management reporting

systems, Decision support systems. Reports: detailed, historical, Summary and exception reports, Challenges in building Information system

- Information Systems for Strategic Advantage: Discuss how organizations can use information systems for automation, organizational learning, and strategic support. Describe information systems' critical strategic importance to the success of modern organizations. Define the term strategic advantage and discuss how organizations are using information systems to gain such an advantage. How should a manager think about competitive strategies? How can competitive strategies be applied to the use of information systems by an organization?
- Information Systems in the Enterprise: Describe what enterprise systems are how they have evolved. Explain how organizations support business activities by using information technologies. Understand and utilize the keys to successfully implementing enterprise systems. Identify some of the strategies employed to lower costs or improve service. Discuss how organizations justify the need for information systems. Define the types of roles, functions, and careers available in information systems.
- Hardware & Software: Describe how to select and organize computer system components to support information system objectives and business organization needs. Discuss how applications software can support personal, workgroup, and enterprise business objectives.
- Telecommunications: Identify types of communications media and discuss the basic characteristics of each. Identify several types of telecommunications hardware devices and discuss the role that each plays. Identify the benefits associated with a telecommunications network.
- Data and Knowledge Management Explain how organizations are getting the most from their investment in database technologies. Describe what is meant by knowledge management and knowledge assets as well as benefits and challenges of deploying a knowledge management system
- Decision support systems, Decision making concept, Decision support system versus management information systems, Decision support model
- Executive support systems
- Expert systems
- Group support systems

f) **Assessment method:** The assessment will be in form of tests and assignments (40%) and final written exam (60%)

g) **Reference Books:**

- (i) Decision Support Systems and Intelligent Systems, Efraim Turban and Jay E. Aronson, Sixth Edition
- (ii) Management Information Systems, A Managerial End User Perspective (1999), James A. O' Brien, 4th Edition, Irwin/McGraw Hill
- (iii) Management Information Systems, Managing Information technology in Business Enterprise (2004), James A. O' Brien, 6th Edition, TATA -McGraw Hill
- (iv) Management Information systems: Managing the Digital firm by K.C. Laudon and J.P. Laudon, Prentice Hall.

- (v) Management Information systems: Organization and Technology by K.C. Laudon and J.P. Laudon, Prentice Hall.

MIT 8104 Online Information Services (3 CU)

(a) **Course Description:** The course examines a role and a place of Online Information Services (OIS) at the present stage of Information Revolution. It discusses changes in the modern society and information industry due to Online Information Services. Then different kinds of existing and emerging OIS such as Information Conglomerates and Supermarkets, Online Mass Media, Online Libraries, Online Shops and Auctions are described in details. Also the role of governmental and non-governmental organizations in OIS development and promotion will be examined. Students will seize knowledge and practical skills of critical assessment of existing OIS. Finally, a forecast of future OIS development will be given.

(b) **Aims:** The course aims in developing:

- in-depth knowledge and understanding of
 - the role and the place of OIS at the present stage of Information Revolution
 - changes in the modern society and information industry due to OIS
 - different kinds of OIS
 - the role of governmental and non-governmental organizations in OIS development
 - main criteria for critical assessment of existing OIS
 - major trends in future OIS development
- skills
 - of critical assessment of existing OIS

(c) **Learning Outcomes:** On completion of this course unit, the students will be able to have:

- in-depth knowledge and understanding of
 - the role and the place of OIS at the present stage of Information Revolution
 - changes in the modern society and information industry due to OIS
 - different kinds of OIS
 - the role of governmental and non-governmental organizations in OIS development
 - main criteria for critical assessment of existing OIS
 - major trends in future OIS development
- skills
 - of critical assessment of existing OIS

(d) **Teaching and learning pattern:** Since this course is supposed to have only lecture hours, it will form mostly the theoretical knowledge. To provide students with practical skills, they will be given individual and group assignments to be done as a form of extracurricular activity.

(e) **Indicative content:**

- Role and place of the Internet, World Wide Web and Online Information Services in particular at the present stage of Information Revolution. Changes in the modern society due to the Internet, World Wide Web and Online Information Services.
- Online information industry today and changes within it.
- Information Conglomerates and Supermarkets (such as search engines - Yahoo, Google; Wikipedia, Google Maps, Panoramio, YouTube etc).
- Online Mass Media (newspapers, journals online, sites of TV companies - BBC, CNN, Aljaseera, local).
- Online libraries and how they relate to traditional libraries.
- E-commerce. Online shops
- Role of government in online services development. How governments interfere or promote Online Information Services development. How governments attempt to control Online Information Services (censorship of content etc). National laws reglamenting Online Information Services and online information delivery.
- Public/non-governmental/commercial organizations promoting Online Information Services.
- Critical assessment of existing Online Information Services. The content, usability, appearance etc.
- Forecast of future Online Information Services development.

(f) **Assessment method:** The students shall be evaluated through the coursework (40%: Test I: 15%, Test II: 15%, Assignment: 10%) and a final examination (60%)

(g) **Reference Books:**

- (i) Davis, J. et al. (2006). Information Revolution: Using the Information Evolution Model to Grow Your Business. Wiley.
- (ii) Wilhelm, A. G. (2006). Digital Nation: Toward an Inclusive Information Society. The MIT Press.
- (iii) Tansey, S. (2002). Business, Information Technology and Society. Routledge.
- (iv) Hassan, R. (2008). The Information Society: Cyber Dreams and Digital Nightmares (Digital

- Media and Society). Polity.
- (v) Webster, F. (2006). Theories of the Information Society: Third Edition (International Library of Sociology). Routledge; 3rd edition.
 - (vi) Zook, M. (2005). The Geography of the Internet Industry: Venture Capital, Dot-coms, and Local Knowledge (Information Age Series). Wiley-Blackwell.
 - (vii) Hartley, J. Creative Industries. Wiley-Blackwell; illustrated edition.
 - (viii) Samil, M. (2004). International Business and Information Technology: Interaction and Transformation in the Global Economy. Routledge; 1st edition.
 - (ix) Shy, O. (2001). The Economics of Network Industries. Cambridge University Press.
 - (x) Fox, S. (2009). E-Riches 2.0: Next-Generation Marketing Strategies for Making Millions Online. AMACOM.
 - (xi) Tomaiuolo, N. (2004). The Web Library: Building a World Class Personal Library with Free Web Resources. Information Today, Inc.; 1 edition.
 - (xii) Farkas, M. (2007). Social Software in Libraries: Building Collaboration, Communication, and Community Online. Information Today, Inc.
 - (xiii) Holden, G. (2007) Starting an Online Business for Dummies (For Dummies (Computer/Tech)). For Dummies; 5 edition.

MIT 8110 Computer Security (3 CU)

- (a) **Course Description:** This course is designed to prepare students for the ever changing security threats to computer systems. Security and privacy are pivotal issues in today's networking environment. With the increase of breadth and depth on computer and information attacks among non-profit, commercial and government computing systems, computer security is now an essential infrastructure in computer architecture. The safe transmission of information relies on a proper design of computer security architecture. This course introduces a clear overview of the security concepts, including access control, malicious software, cryptography, biometrics as well as government regulations and standards. Various security models, policies and implementations techniques are explained and evaluated. Students on successful completion of this course will have the capability to describe, discuss and design network security using classical and contemporary models.
- (b) **Aims:** A student that undertakes this course should:

- Be able to describe, discuss and perform design of network security using classical and contemporary models.
- Be able to develop the ability to think critically
- Be able to develop the ability to reason quantitatively

(c) **Learning outcomes:** Upon successful completion of the course the student will reliably demonstrate the ability to:

- Think analytically and critically.
- Design a corporate information security strategy
- Develop a secure IT architecture
- Write a computer security policy
- Monitor and analyze computer security events and controls
- Sort and respond to computer security threats
- Explain the guidelines and procedures of computer security investigations.
- Understand regulatory issues related to computer security investigations.
- Demonstrate knowledge of digital forensics hardware and software.
- Demonstrate knowledge of various operating systems and their file systems, digital media and forensics software.

(d) **Teaching and learning pattern:** Teaching will be by lectures, take home reading assignments/class presentations and laboratory practicals.

(e) **Indicative content:**

- Principles of IT security including the OSI model, Information Security Components, Security threats and the need for information security,
- Information Security Principles: Authentication and Authorization, Access Controls, Confidentiality, Data Integrity, Non-repudiation, Accountability and Availability, Research Methods
- Security Management Practices
- Application and System Development Security
- Operations Security
- Data Network Protocols (TCP/IP, IPSec, UDP etc.)
- Firewalls and Firewall Architecture
- Hacker Tools and Techniques including War dialers, scanners, sniffers, session hijacking, password cracking
- Basic OS Security Architecture for UNIX and MS OS (i.e. NT and Win 2k, XP), Unix File system security, NFS, Access Controls and Configuring Network Services Case Studies on Unix Vulnerability, MS OS Security Principles, Windows NT Security Architecture (Registry, Domain, Authentication.), Ns and Remote Access
- Auditing and Logging

- Security Architecture and Models: Kerberos, Public Key Infrastructure, Directory Structures, Entitlement
 - Basic Database security
 - Intrusion Detection and Monitoring: Purpose and Rationale, Design and Architecture, Technology, Process and Procedures
 - Business Continuity Planning
 - Physical Security
 - Basic Cyber law and Forensics
 - Privacy regulation that affect information security
- (f) **Assessment methods:** Assessment will be in terms of tests and take home assignments (40%) and a final examination (60%)
- (g) **Reference Books:**
- (i) Rick Lehtinen, G. T. Gangemi, Sr. (2006). Computer Security Basics. 2nd Ed. O'Reilly Media. ISBN 10 0-596-00669-1
 - (ii) Mark Ciampa (2005). Network Security Fundamentals. 2nd Ed. Thompson Course Technology. ISBN: 0-619-21566-6
 - (iii) Joel Scambray, Stuart McClure and George Kurtz (2000) Hacking Exposed. 2nd Ed. McGraw-hill
 - (iv) Hill Professional Publishing; ISBN: 0072127481
 - (v) John Vacca (1996). Internet Security Secrets. Hungry Minds, Inc; ISBN: 1568844573.

MIT 8115 Corporate Network Management (3 CU)

- (a) **Course Description:** This course is designed to equip students with knowledge of how Telecommunications Networks can be harnessed to support enterprise business processes. It specifically looks at the regulatory framework, management architectures, network documentation and relevant standards applicable to the Telecommunication Networks.
- (b) **Aims:** The course aims at:-
- Introducing students to the concepts relevant to documentation and management of Telecommunication Networks
 - Equipping students with relevant knowledge to enable them harness the power of telecommunication networks for the enterprise.
- (c) **Learning outcomes:** On completion of this course unit, the students will be to:

- Articulate the specific uses of telecommunications for business as well as follow the current status and future directions of telecommunications regulatory environment.
- Discuss the strategic management issues and the 90 options created by emerging technologies.
- Develop documentation to support organizational requirements for a telecommunications network

(d) **Teaching and learning patterns:** Course delivery will be in form of lectures and tutorials.

(e) **Indicative content:** Topics to be covered include 1. Documenting the Network: requirements capture and specification, functional specification, design specification, documenting the network configuration. 2. Managing the Network: influences on the network, management architectures and standards, performance management, spectrum management, fault management, disaster management, managing changes in a network, cost minimization management 3. Corporate and Regulatory Requirements: management teams, operations and support, standards and protocols; implications of broadband networks for traffic integration.

(f) **Assessment method:** Assessment will be in terms of tests and practical exercises (40 %) and a final examination (60%)

(g) **Reference books:**

- i. Network Management Fundamentals by Alexander Clemm, Cisco Press, 1st Edition (2006): ISBN – 10: 1587201372.
- ii. Network Management Know It All Adrian Farrel, Morgan Kaufmann (2008): ISBN – 10: 0123745985.

MIS 8116 Enterprise Integration and Collaborative Communication (3 CU)

(a) **Course description:** This course focuses on the design and management of an overall organizational system consisting of three interacting subsystems:

- i. the enterprise itself - its structure, core processes, and relationships with external entities such as customers, suppliers, and outsourcers;
- ii. the IS function and its role in marshalling information technologies and information assets to support the strategy of the organization, and
- iii. the information technology architecture consisting of the organization's networks, hardware, data, and applications.

- (b) **Aims:** The course aims to provide the skills and knowledge needed to assume a leadership role in helping organizations utilize computer and communication systems to achieve their objectives. Students use the technical, managerial, and social skills developed in the rest of the curriculum to understand and develop reasoned responses to the major forces shaping the role of IT in organizations competing in a global economy.
- (c) **Learning Outcomes:** On completion of this course unit, the students will be able to:
- Integrate and synthesize these three aspects of the enterprise, how IT must be aligned with the strategy of the organization, and how to make appropriate choices about architecture in relationship to overall organization goals.
 - Develop reasoned responses to the major forces shaping the role of IT in organizations competing in a global economy.
- (d) **Teaching and learning pattern:** Teaching will be in terms of lectures, case studies and group work.
- (e) **Indicative content:**
- **The Enterprise System:** This section of the course focuses on organizational and managerial issues at the level of the enterprise as a whole:
 - An integrated view of the firm and its relations with suppliers and customers
 - Organizational strategy: customer, product, operational and compliance objectives and their implications for IT management and architecture
 - Core business processes
 - Role of ERP, supply chain and customer relationship management systems
 - The economic value of information technology
 - Strategic alignment of IT
 - **The IS Function:** This section of the course focuses on managing the IS function to further the policy and strategies of the enterprise:
 - IT's key business processes
 - IT organizational structure and governance alternatives
 - Human resource needs and management methods
 - Methods to measure and demonstrate the value of IT
 - Methods and organization to ensure regulatory compliance
 - Managing sourcing
 - **The Technologies:** This section of the course is concerned with how to develop an integrated enterprise architecture consonant with organizational policies and strategies:
 - Evaluating and selecting among architectural and platform choices, priorities, and policies
 - Assessing the impact of emerging technologies
 - Evaluating the role of standards

- Evaluating the effect of vendor strategies
 - Overview: The final section of the course provides an overview of the information systems role in the enterprise:
 - The role of the CIO
 - The future role of information technology in the organization and society.
- (f) **Assessment method:** The assessment will be in form of tests and assignments (40%) and final written exam (60%)
- (g) **Reference books:**
- (i) Joseph Brady, Ellen Monk and Bret Wagner, Concepts in Enterprise Resource Planning. Course Technology; 1 edition (March 30, 2001) ISBN-10: 0619015934, ISBN-13: 978-0619015930
 - (ii) David Olson and David Olson. Managerial Issues of Enterprise Resource Planning Systems. McGraw-Hill/Irwin; 1 edition. ISBN-10: 0072861126. ISBN-13: 978-0072861129
 - (iii) Beth Gold-Bernstein; William Ruh, Enterprise Integration: The Essential Guide to Integration Solutions, Addison-Wesley Professional, ISBN-10: 0-321-22390-X, ISBN-13: 978-0-321-22390-6

MIT 8116 Multimedia and Emerging Technologies (3 CU)

(a) **Course Description:** First, definition of terms and concepts is given. Then, multimedia capture, authoring, production, compression tools and techniques are considered. Graphic and streaming media formats are discussed including their characteristics and interoperability. Students learn how to deploy and serve media contents within Web applications. Other issues include enhancing Web accessibility through using multimodal user interface. A virtual reality as an example of an emerging technology is given.

To provide students with practical skills, they will be given individual and group assignments to be done as a form of extracurricular activity.

(b) **Aims:** This course aims on providing students with

- knowledge and understanding of
 - core concepts, technologies and formats of multimedia
 - concept of Virtual Reality
- skills of
 - multimedia capture, authoring, production and compression
 - skills of deploying and serving media contents within Web applications

(c) **Learning Outcomes:** On completion of this course unit, the students will be able to:

- knowledge and understanding of core concepts, technologies and formats of multimedia
- skills of multimedia capture, authoring, production and compression
- skills of deploying and serving media contents within Web applications
- knowledge about how Web accessibility can be enhanced through using multimedia
- knowledge of the concept of Virtual Reality as an emerging technology

(d) **Teaching and learning pattern:** Since this course is supposed to have only lecture hours, it will form mostly the theoretical knowledge. To provide students with practical skills, they will be given individual and group assignments to be done as a form of extracurricular activity.

(e) **Indicative content:** Definition of terms and concepts. Multimedia capture; authoring; production; compression tools; and techniques; Graphic and streaming media formats; their characteristics and interoperability. Using media contents within Web applications; Web accessibility; and multimodal user interface. Other issues include enhancing Web accessibility through using multimodal user interface. A virtual reality as an example of an emerging technology is given.

(f) **Assessment method:** The students shall be evaluated through the coursework (40%: Test I: 10%, Test II: 10%, Assignment: 20%) consisting of Individual Assignment, Tests, a group project, and a final examination (60%)

(g) **Reference Books:**

- (i) Chapman, N., Chapman, J. (2000). Digital Multimedia. John Wiley & Sons Ltd. ISBN 0-471-98386
- (ii) Lee, W.W., Owens, D.L. (2000) Multimedia-Based Instructional Design. Jossey-Bass/ Pfeiffer. ISBN 0-7879-5159-5
- (iii) Li, Z.-N., Drew, M.S. (2004). Fundamentals of Multimedia. Pearson Higher Education.
- (iv) Garrand, T. (2006). Writing for Multimedia and the Web: A Practical Guide to Content Development for Interactive Media (Third Edition). Elsevier Inc., Oxford, UK.
- (v) Coorough, C., Shuman, J.E. (2006). Multimedia for the Web Revealed: Creating Digital Excitement. Course Technology.

MIT 8117 XML and Web Services (3CU)

(a) **Course Description:** Necessary pre-requisites for this course are Web Design and

Usability containing an overview of Web technologies and security-related courses. This course includes the following topics: XML, XML Schema, XSLT, XPATH, the Web Services Protocols (SOAP, WSDL and UDDI), Web Services Security Protocols (WS-Security, XML Key Management, XML Signature, Security, Assertion Markup Language), Web Services Orchestration & Execution (Web Services Choreography Interface, Business Process Execution Language for Web Services, WS –coordination, WS – Transaction), Web Services Interoperability, XML Editors & Mappers, relationship between XML & J2EE, MS.NET and XML Databases.

(b) **Aims:** the aims of the course are to:

- develop in-depth knowledge and understanding of XML, XSL, XSLT, XPath, XML Schema, Web Service Protocols, Web Service Security Protocols, Web Services Orchestration & Execution, Web Services Interoperability, relationship between XML & J2EE, MS.NET and XML Databases;
- develop skills of:
 - creating documents using XML, XSL, XSLT and XPath;
 - creating XML schemas and validating XML documents against them;
 - describing Web Services using WSDL and UDDI;
 - using XML Editors and Mappers.

(c) **Learning outcomes:** On completion of this course unit, the students will be able to:

- develop in-depth knowledge and understanding of XML, XSL, XSLT, XPath, XML Schema, Web Service Protocols, Web Service Security Protocols, Web Services Orchestration & Execution, Web Services Interoperability, relationship between XML & J2EE, MS.NET and XML Databases;
- develop skills of:
 - creating documents using XML, XSL, XSLT and XPath;
 - creating XML schemas and validating XML documents against them;
 - describing Web Services using WSDL and UDDI;
 - using XML Editors and Mappers.

(d) **Teaching and learning pattern:** Since this course is supposed to have both lecture and practical hours, it will form the theoretical knowledge as far as practical skills. To provide students with practical skills, they will be given sample documents (XML, XSL, XML Schema, SOAP etc) for the analysis as far as individual and group assignments to be done within practical and extracurricular hours.

- (e) **Indicative content:** Necessary pre-requisites for this course is Web Design and Usability containing an overview of Web technologies and security-related courses. This course includes the following topics: XML, XML Schema, XSLT, XPATH, the Web Services Protocols (SOAP, WSDL and UDDI), Web Services Security Protocols (WS-Security, XML Key Management, XML Signature, Security, Assertion Markup Language), Web Services Orchestration & Execution (Web Services Choreography Interface, Business Process Execution Language for Web Services, WS –coordination, WS – Transaction), Web Services Interoperability, XML Editors & Mappers, relationship between XML & J2EE, MS.NET and XML Databases.
- (f) **Assessment method:** Assessment will be in terms of tests and Assignment (40%: Test I: 15%, Test II: 15%, Assignment: 10%) and final examination (60%)
- (g) **Reference books:**
- (i) Deitel, H.M., Deitel, R.M., Nieto T.R. (2003). Internet & World Wide Web How to Program: Featuring XML and XHTML (Second Edition). Prentice Hall, New Jersey. ISBN 0-13-030897
 - (ii) Yuen, P.K., Lan, V. (2003). Practical Web Technologies. Pearson Education Ltd. ISBN 0201 750767
 - (iii) Extensible Markup Language (XML). Retrieved from <http://www.w3.org/XML/> 9.04.09
 - (iv) The Extensible Style sheet Language Family (XSL). Retrieved from <http://www.w3.org/Style/XSL/> 9.04.09
 - (v) XML Schema. Retrieved from <http://www.w3.org/XML/Schema> 9.04.09
 - (vi) Web Services. Retrieved from <http://www.w3.org/2002/ws/> 9.04.09
 - (vii) Web Services Description Working Group. Retrieved from <http://www.w3.org/2002/ws/desc/> 9.04.09

MIT 8118 Web based Information Systems and Web Mining Technology (3 CU)

- (a) **Course Description:** Organizations are increasingly using the Internet and World Wide Web to conduct their business operations, and in searching for new opportunities. Knowledge and understanding of the technologies required for communication and

knowledge discovery from the World Wide Web are critical for success in such organizations. This course unit addresses the issues and problems involved in providing information and services via the Internet with particular reference to the World Wide Web. It exposes students from a variety of backgrounds, to the technical aspects of information systems and knowledge discovery on the web.

(b) **Aims:** The course aims to introduce students to the issues related to the design and implementation of web-based information systems. Key technologies and tools for exchanging, managing, marketing and communicating data in web based information systems. Another aim is to introduce the theory of Web Data Mining, information retrieval and their applications to web based applications and business intelligence. Specific techniques of data mining, text mining, and information retrieval for extracting knowledge and security issues on the Web are introduced. It provides students with the theoretical background and training to enable students' carry out research into an area of specific interest in web based information systems and data mining.

(c) **Learning outcomes:** At the end of the course the students will be able to have:

1. Knowledge and Understanding of the:
 - World Wide Web as an information resource.
 - Basic methods and technology of the World Wide Web.
 - Basic methods and technology of web based data mining.
 - Security, privacy and related issues in the context of information exchange via the World Wide Web
2. Intellectual Skills
 - Ability to formulate and express problems in the area of web based information systems and web data mining.
 - Analyze and evaluate academic literature within in the area of web based information systems and web data mining.
3. Practical Skills
 - Report writing
 - The students should be able to design and build professional solutions for web-based applications using various technologies.
4. Transferable Skills
 - Ability to learn by themselves by investigating beyond the basics covered in class.

(d) **Teaching and learning patterns:** The teaching and learning approaches will combine classroom lectures, discussions and group activities, quizzes and take home assignments.

A group project shall form part of the coursework. The material presented in class will overlap that of the text but will contain additions and variations

(e) **Indicative content:** The course introduces web-based information systems. It highlights modern HTML and XML technologies in the context of Web management, marketing and communications. Cutting-edge data mining and text mining techniques applied to the discovery and analysis of useful information from the Web are also considered.

(f) **Assessment method:**

- Coursework = 40% consisting of:
 - Two written tests
 - Group project (with practical laboratory work involving creation of interactive www pages)
 - One take home individual assignment (journal literature)
- Final written examinations (3 hours) = 60%

(g) **Reference books:** There is no single authoritative textbook for this course. Research papers where applicable will be selected from a variety of journals, conference proceedings and websites like W3C.

- (i) Instant HTML Programmer's Reference, Alex Homer, Chris Ullman & Useful
- (ii) Steve Wright, Wrox, 1998, 1-861001-56-8
- (iii) Internet & World Wide Web – How to Program, H.M.Deitel, P.J.Deitel & T.R.Nieto, Prentice Hall, 2000, 0-13- 016143-8
- (iv) XML – How to Program, H.M.Deitel, P.J.Deitel, T.R.Nieto, T.M.Lin & P.Sadhu, Prentice Hall, 2000, 0-13-028417-3

7. Resources and Infrastructure

The Faculty of Computing and Information Technology and specifically the Department of Information Technology have sufficient resources and infrastructure to suitably run the program as further described below.

7.1. Source of Funds

Fees payable by the students will enable the University to sustain the programme.

7.2 Staff

The Department of Information Technology (see list of staff members in Appendix A) in conjunction with other departments in the Faculty of Computing and Information Technology have an adequate number of staff who can competently teach the courses.

7.3. Lecture Space

The Faculty of Computing and Information Technology is housed on 2,500 and 12,000 square meter buildings known as Block A and B, respectively. Block A mainly accommodates offices and a few laboratories, while Block B has lecture rooms together with the rest of the general and specialized laboratories. The two buildings sufficiently cater for all the lecture and lab space requirements for all the teaching in the faculty. Specifically CIT has 6 lecture theatres each of 400 square metres (600seat capacity); 6 small lecture theatres of total area 1200 square metres and 1800 square metres of circulation space where students are able to access other services such as wireless internet services.

7.4. Computer Laboratories and Software

The FCIT buildings i.e. Block A and B respectively, have general laboratories (for student practice), teaching laboratories and specialized laboratories, that are shared among the four departments. At present, these laboratories have in total approximately 2000 computers. In summary, CIT has got 6 computer laboratories each of 800 square metres (1000 seat capacity) and 6 small laboratories of total area 1200 square metres. More lab details can be found on the Faculty website: <http://cit.ac.ug/cit/facilities/labs.php>.

At the same time, the Faculty has an approximation of 5000 students; which makes the student to computer ratio 1:2.5. This is adequate for the practical components of the curriculum.

In addition to the physical computers, different software is installed for usage by students depending on their focus. Most of the software is available as free distributions for academic purposes. The faculty and department therefore have (and can access) enough software that can run the practical aspects of the program.

7.5. Library Services

Makerere University Library supports a book bank system which is operated at the Faculty level (Block B Building). The book bank is stocked with up to date literature. The books in the book bank have been acquired through supplies from the Makerere University Library and purchases by the Faculty for books that are difficult to purchase by the main library. In addition to this facility the Makerere University main library provides access to books, print journals, e-journals, a well

stocked reference section and connections to many remote databases. The Online Journals which are also accessed through the main University library provide a range of products from abstracts to full text papers. The University Library has also acquired a wide range of online books which are to access and this is in line with promoting e-learning.

8. Quality Assurances

Several activities will be carried out as quality assurance measures so as to:

- (a) Measure the general extent to which the required skills have been achieved
- (b) Ascertain the Implementation of the methodological changes proposed
- (c) Create a feed back bench marks for possible future revisions in the curriculum

The following activities will be carried out in the process of monitoring and assuring quality in the program.

8.1. Feedback from students enrolled

In the current set up, each class has 1 student representative. These representatives are in constant contact with the Head of Department in case there are any quality related matters in a particular class. This set up is to be maintained.

In addition, at the end of each semester, samples of students from respective classes/years are given questionnaires to respond to several quality related matters like staff punctuality, delivery mode, course content and the general perceived usefulness of the course unit.

We note that the Faculty of Computing and Information Technology is in the process of creating a computerized system that will capture and analyze the data collected from the students. With the computerized system:

- (i) Every student will be required to assess every lecturer teaching him/her, the sample space will therefore be increased
- (ii) No time will be required in the analysis of the results. Staff and faculty management will be able to get the feedback instantly
- (iii) Data will be easily archived and therefore the trend of staff performance in the respective areas will be easy to visualize

8.2. Class meetings

The faculty management makes at least 2 meetings with every class every semester. In this meeting, general quality issues are addressed. Students are also given a chance to raise any

questions that are answered and/or addressed by the department management. This set up will also continue.

8.3. Use of ICT in availing lecture materials

Currently, Makerere University has the blackboard e-learning tool on its Intranet. Students in the Department of Information Technology have adequate access to computers. This creates conducive environments for e-learning blended teaching. All courses in the new curriculum will be taught in a blended way. All course materials will be put on blackboard. Staff will, as much as possible, make use of e-learning facilities like discussion forum and drop boxes for assignments. This will increase student activity/participation and reduce staff effort (e.g. staff will not need to dictate notes). This will result to increase in the material covered and taken in by the students.

8.4. Peer review

All members of staff will enroll (as students) to all classes taught in the department. They will therefore be able to view contents of courses taught by their peers. The staff will be free to advise fellow staff on the content, depth and presentation of materials. Consequently, for every course, students will access the best possible material in the view of all staff in the department not the course instructor.

8.5. External examiners' reports

Like it is everywhere in Makerere University, students' research dissertations and exams are reviewed by senior external examiners. This is to bring a 'foreign view' of the quality of the research and examination. External examiners write reports on their view of the research, curriculum, and examinations. Recommendations for the students about their research should be implemented immediately prior to viva-voces while for exams can be implemented immediately or in a longer term. The department will make the maximum possible use of external examiners' reports as a means of assuring quality in the program and research.

8.6. Tracer studies

The Faculty of Computing and Information Technology is devising ways of keeping in contact with its alumni together with their employers. This is with a view of making a tracer study of its graduates. The Department of Information Technology will use outputs of the tracer studies to gauge the quality of the program and whenever necessary improve it.

Appendix A. IT Departmental Academic Staff List

S/N	Name	Rank	Qualification/ Comment	Specialization	Current Teaching Load		Proposed Teaching Load		Total Load (CU)	
					Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 1	Sem. 2
1	Irina Ya. Zlotnikova	Visiting Professor	PhD	ELearning, Theory and Methodology of Computer Science Education, Software Engineering for Educational Purposes, Development of Educational Web Resources			MIT 8100: Secure Computer Systems (3CU) & MIT 7100: Information Security (3CU)	MIT 7214: Audit and Security Assurance Principles (3CU)	6	3
2	Joseph K. Ssewanyana	Senior Lecturer	PhD	Business process modeling, and ICT for development			MIS 7100: Systems Analysis and Design (3CU) & MIT 8101: Network Security (3CU)	MIS 7209: Project and Organization Change Management (3CU) & MIT 7215: IT Strategic Planning and Management (3CU)	6	6
3	Jude T Lubega	Lecturer	PhD Ag. Deputy Dean (GSR)	Tracking and Assessment in e-learning, Content Authoring, Multimedia, Multi-			MIT 7115: Contemporary Issues in IT (3CU)		3	

				Agent Systems, Knowledge Representation, and ICT for Development, Web-based Systems and Mobile Learning						
4	Josephine Nabukenya	Lecturer	PhD Ag. Head of Department	Collaboration Engineering, Analysis and design of information and systems flows; and Facilitating organizational change by adoption and diffusion of ICT			MIT 7116: Research Methodology (3CU) & MIT 8102: Database Security (3CU)	MIT 7218: Legal & Ethical Aspects of Computing (3CU)	6	3

Appendix B. Full Time Staff from Other Departments

S/N	Name	Rank	Qualification/ Comment	Specialization	Current Teaching Load		Proposed Teaching Load		Total Load (CU)	
					Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 1	Sem. 2
1	Patrick Ogao	Associate Professor	PhD	GIS, Computer graphics, visualization			MIT 8103: Applied Cryptography (3CU)		3	
2	Martin Bagaya	Lecturer	PhD	Web Services, Database Design and Administration, Offshore outsourcing, Security			MIS 7110: Database Systems (3CU)		3	
3	Agnes R Semwanga	Lecturer	PhD	Education (specifically math), Management Information Systems, Computer Modeling and simulation, Decision support systems			MIT 8104: Online Information Services (3CU)		3	
4	Jose Quinum	Senior Lecturer	PhD	Computer Science, Software Engineering and Security				MCS 7226: Seminar Series (2CU)		2

Appendix C: Visiting Staff

	Name	Highest Degree	Rank	Specialization	University	Proposed Teaching Load		Visiting Period
						Sem 1	Sem 2	
1	Greg Gibbon	PhD	Senior Lecturer	Mathematical Logic	University of New Castle	MIT 8109: Web-based Information Systems & Web Mining Technology (3CU)	MIT 7216: E-Service Delivery (3CU)	August 2009- May 2010
2	Janet Aisbett	PhD	Professor	Information Systems	University of New Castle	MCS 8100: Artificial Intelligence & Expert Systems	MIT 7217: Web Design and Usability (3CU)	August 2009- May 2010
3	HN Muyingi	PhD	Professor	Information Systems	University of Fort Harare	MIT 8108: Supply Chain Management (3CU)		August – Dec 2009
4	Timothy M. Waema	PhD	Assoc. Professor	Information Systems	University of Nairobi	MIT 8107: Security, Risk Management and Control in e-commerce (3CU)		August – Nov 2009

5	Ravi Nath	PhD	Professor	Information Technology	Creighton University		MIT 8106: Web Database Applications (3CU)	August – Nov 2009
6	Jean Hall	PhD	Senior Lecturer	Information Technology	University of Australia		MIT 7100: Information Security (3CU)	August – December 2009
7	Kathy Lynch	PhD	Senior Lecturer	Information Technology	University of Monash		MIT 8105: IT Strategy and Management (3CU)	August 2009 – January 2010

Appendix D: Part-time Staff from Other Institutions outside Uganda under the project 'Strengthening ICT Training and Research Capacity in the Four Public Universities in Uganda'

	Name	Highest Degree	Rank	Specialization	Comments
1	Koos Duppen	PhD	Professor	CS	University of Groningen
2	Wim H Hesselink	PhD	Professor	CS	University of Groningen
3	Jan Bosch	PhD	Professor	CS	University of Groningen
4	Gert Vetger	PhD	Professor	CS	University of Groningen
5	Doitse Swierstra	PhD	Professor	CS	Utrecht University
6	Hendrik Alex Proper	PhD	Professor	CS	Radboud University Nijmegen

7	Theodorus Petrus van der weide	PhD	Professor	IS	Radboud University Nijmegen
8	Peter Lucas	PhD	Ass. Professor	CS	Radboud University Nijmegen
9	Renardel de Lavalelte, Gerald Rudol	PhD	Professor	Math / CS	University of Groningen
10	Karl Leo Lambert Marie Dittrich	PhD	Assistant Professor	Management	University of Groningen
11	Richard Wait	PhD	Professor	IT	Uppsala (Sweden)
12	Hendrik Jan Van Linde	PhD	ICT Consultant	Mathematics/ CS	University of Groningen
13	John Nerbonne	PhD	Professor	IS	University of Groningen
14	Jan Folkert	PhD	Ass. Professor	Educational ICT	University of Groningen
15	Jos Tolboom	PhD	Programme Manager	Math/ CS	University of Groningen
16	Robert Janz	PhD	Director	IT	University of Groningen
17	Marc Petit	PhD	Senior Consultant	Math/ CS	University of Groningen
18	Rein Smedinge	PhD	Faculty IT Staff	CS	University of Groningen
19	Marinus (Rien) A.C Dam	PhD	Management	Earth Sciences	University of Groningen
20	Harm Bakker	Msc.	Senior Lecturer	CS	University of Groningen
21	Ria Klasine Jacobi	MSc	Senior Educational Consultant	ICT & Education	University of Groningen