

MASTER OF SCIENCE IN INFORMATION SYSTEMS

1. INTRODUCTION

With the new advancements in the field of computers and in a time when there is a boom in the local IT industry, the Jaramogi Oginga Odinga University of Science and Technology, School of Informatics and Innovative Systems (SIIS) has introduced MSc in Information Systems, a two year postgraduate programme for professional in the information systems sector industry. The school is contributing in its own inimitable way to the development of information systems by offering this course with the help of efficient and highly qualified researchers and lecturers through a well-equipped computer lab. The course provides rigorous advancement of applied concepts of information systems and Information Technology. In the second year students also gets an opportunity to undertake a project. Hence, the combination of the applied concepts and practical training on software tools to produce graduates with the requisite knowledge and skills required of Information Systems professionals in academia and industry. This conversion course is mainly for none computer science graduates.

There is a significant demand for graduate professionals with training and understanding in Information Systems (IS) in academia and industry. Successful candidates of this course may enter positions in a variety of areas such as researchers, Senior Analysts and Developers and System Administrators.

2. OBJECTIVES

The overall objective of the programme is to produce skilled, motivated and internationally competitive information systems graduates to work in both private and public informatics sector of the economy. The specific objectives of the programme are:

To equip graduates with the ability to apply information systems knowledge, skills, techniques and tools to create best-possible IS solutions.

To arm students with skills necessary to facilitate the acquisition, adoption and adaptation of information systems knowledge, techniques and tools to improve organization performance.

To train graduates who are innovative and creative, who possess good problem-solving skills and are capable of life-long learning.

To produce all-rounded graduates with demonstrable ethical and professional behaviour, and who possess effective communication, management, entrepreneurial and interpersonal skills.

3. ADMISSION REQUIREMENTS

To qualify for admission into the Master Degree candidates shall be:

- (a) Holders of at least an upper second class honours degree in any field from Jaramogi Oginga Odinga University of Science and Technology or any other recognized University
- (b) Holders of a lower second class honors degree of Jaramogi Oginga Odinga University of Science and Technology or any other recognized University and a Postgraduate Diploma in Information Systems, or IT from any other recognized University, or evidence of two years work experience.

In addition to the above, applicants must meet the specific requirements of the Masters programme as approved by the Senate.

4. COURSE STRUCTURE AND DURATION

The MSc course shall normally take two years covering 4 semesters offered by unit method.

Courses shall be offered in units. A course unit is defined as that part of a semester subject described by coherent syllabus and taught normally over a period of a semester. It is designated as a total of 42 hours. For this purpose, one 1-hour lecture is equivalent 2-hours tutorial or 3-hours practical or any combination as may be approved by the Board of the School of Informatics and Innovative Systems.

Part-time students shall be allowed to take not less than 50% of the courses prescribed for the year.

All course units will be taught for a total of 42 contact hours, including examinations except project work which will take 480 hours of practical work and project writing.

5. EXAMINATIONS REGULATIONS

Jaramogi Oginga Odinga University of Science and Technology Examinations rules and regulation shall apply.

6. COURSE DISTRIBUTION

One semester shall comprise minimum of four (4) units and a maximum of six (6) units.

YEAR ONE: SEMESTER ONE

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIS 5111	Software Project Management	28	14	42	1C
IIS 5112	Object Oriented Tools & Techniques	28	14	42	1C
IIS 5113	Object Oriented Analysis & Design	28	14	42	1C
IIS 5114	Advanced Databases	28	14	42	1C
IIS 5115	Web Technologies	28	14	42	1C
IIS 5116	Management Information Systems	42	0	42	1C
Total		182	70	252	6C

YEAR ONE: SEMESTER TWO

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIS 5121	Distributed Database Systems	28	14	42	1C
IIS 5122	Decision Support Methods	28	14	42	1C
IIS 5123	E-Business Architecture and Systems	28	14	42	1C
IIS 5124	Multimedia Information Systems	28	14	42	1C
IIS 5125	Database & E-Commerce Integration	28	14	42	1C
IIS 5126	Research Methods	42	0	42	1C
Total		182	70	252	6C

YEAR TWO: SEMESTER ONE

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIS 5211	Innovation & Knowledge Creation	28	14	42	1C
IIS 5212	Decision Support Systems	28	14	42	1C
IIS 5213	Strategic Management of Information Systems	42	0	42	1C
IIS 5214	Organization Management	42	0	42	1C
	Electives (Any 2 Electives)*	28	14	42	2E
Total					6

*ELECTIVES: - Any 2 Electives

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIS 5215	Strategies of Knowledge and Innovation	42	0	42	1E

IIS 5113 Object Oriented Analysis & Design (42 Hrs)

Fundamental principles of object-oriented modeling, requirements development, analysis, and design. Selected topics: specification of software requirements; object-oriented analysis approaches, including dynamic and static modeling with the Unified Modeling Language (UML v2); object-oriented design; object-oriented reuse, including design patterns; and software implementation concerns. Systems Modeling Language (SysML), Object-Oriented Systems Engineering Methodology (OOSEM), managing object-oriented projects, and the Object Constraint Language (OCL). Case studies of OPEN, UML, OMG and popular methodologies will be extensively used.

IIS 5114 Advanced Databases (42 Hrs)

Advanced Database Systems: Object-Oriented (OO) and Object-Relational Database Systems; Distributed and Multidatabase Systems; Advanced Database Applications: Web-Based Database Access, Data Warehouses. Relational model; dependencies and normal form; database specification; the relational design; syntactic and semantic design issues in data analysis; the three-schema approach; semantic modelling; mapping to relational; network; hierarchical data model; database management system; failure and recovery; concurrency management; database security; integrity and control; distributed databases; knowledge base and database systems; object-oriented databases; fourth generation languages and client-server database applications; current topics in database research, and XML databases.

IIS 5115 Web Technologies (42 Hrs)

Web technologies; Internet/Web Fundamentals: basic markup language, various navigational tools and services of the Internet; Topics: creating web pages, using internet protocols, search engines, file compression/decompression, HTTP, FTP, email, listservers, and other related topics. Internet and Web security: Security issues related to Internet services. Topics: operating system; Internet service security mechanisms; implementation of security procedures; operating system level and server level alerts. Emerging Web Technologies: explore, discuss, and research emerging technologies in the web arena. Focus on exposure to up-and-coming technologies relating to the web, and discussion of practical implications of these emerging fields.

IIS 5116 Management Information Systems (42 hrs)

Management information systems (MIS) concepts, its integration into business organizational structures. Basic system modeling tools and techniques are introduced. MIS Subsystems;

Conceptual foundations; hardware/software platforms and trends; database trends, e-commerce, ethical and social issues in the digital .rm. MIS Structure: Operating Elements; Management Activity; Organizational Functions; features of organizations; Organizational and Management support systems: Decision making and decision support; Phases in Decision Making; Concepts of Decision Making; Models: Formal; Business Process Integration; User Machine; Concepts of Information. Focus on new types of infrastructure and applications: ERP (enterprise resource planning), IOS (inter-organisational systems), and CRM (customer relationship management). Discuss opportunities and problems that managers in organisations face as they attempt to use these IT applications to add value to their businesses; transformational changes within and across industries.

YEAR ONE: SEMESTER TWO

IIS 5121 Distributed Database Systems

(42 Hrs)

In-depth study of design and implementation issues in distributed database systems: investigates the architecture, design, and implementation of massive-scale data systems. Concepts of distributed database theory: design and architecture, data fragmentation, replication, and allocation; security, integrity, query processing and optimization, transaction management, distributed concurrency control, and fault tolerance. Applications: large-scale data warehouse and cloud computing systems.

IIS 5122 Decision Support Methods (42 Hrs)

Concepts of decision support methods: overview of management science techniques for informed decision making. Focus on: development of skills in mathematical modelling, study of optimising and non-optimising solutions; latest developments in the analysis of ill-defined and complex planning/decision problems. Selected topics: data analysis and regression, optimization models and applications (workforce scheduling, manufacturing, network design, facility location), sensitivity analysis, decision trees, risk analysis and business simulation models. Emphasis on information systems problems, model development and the use of software packages for decision support.

IIS 5123 E-Business Architecture and Systems (42 Hrs)

Emerging issues for electronic business systems, electronic funds transfer, computerized business systems, automatic product identification and bar code technology, electronic data interchange, infrastructural issues in e-business, electronic payment systems; Electronic commerce retailing and corporate finance; Intranets and supply chain management; remote banking, procurement and purchasing, online marketing and advertisement, home shopping, and auctions. E-business security issues, transaction integrity and electronic payment systems, and legal aspects of e-business. Business-to-business (B2B) transactions, and integrated electronic business deployment and analysis.

IIS 5124 Multimedia Information Systems (42 Hrs)

Multimedia information systems concepts, evolution of multimedia information systems, media and supporting device commonly associated, image databases, techniques for presenting visual information, video databases, multimodels, audio databases, text databases, and multimedia information systems architecture. Designing and deploying multimedia information systems infrastructure. Selected topics: organizing multimedia content, physical storage and retrieval of multimedia data, Content-based Search and retrieval, creating and delivering networked and multimedia presentations, and current research directions.

IIS 5125 Database & E-Commerce Integration (42 Hrs)

Databases design and management; overview of e-commerce technologies and applications: implementation of platform; independent e-commerce Web applications; Building end-to-end e-commerce skills: comparison and selection of commerce architecture, installation and configuration, security considerations e.g., encryption; shopping cart applications and e-payment

systems and transaction analysis; Development of a complete business-to-consumer and a business-to-business site. Internet systems implementation support: operations, ongoing enhancement, and their integration with existing and evolving 'brick and mortar' systems.

IIS 5126 Research Methods (42 Hrs)

Introduces concepts and overview of theoretical background and practical application of various research methods used in computing and information sciences. Discuss general approaches to scholarship in the computing and information sciences field, explore research methods and associated data analysis techniques: correlational and experimental design research techniques. Case studies and overview of a variety of research methods and terminology, and conduct literature reviews.

YEAR TWO: SEMESTER ONE

IIS 5211 Innovation & Knowledge Creation (42 Hrs)

Innovation and knowledge creation concepts. Focus on: recent significant progress in information technology; use of IT for communication and knowledge creation: creation of competitive business environment; use of innovative models to turn ideas into innovations. Case studies and capstone research: covering business problems and creative and innovative enterprise solutions.

IIS 5212 Decision Support Systems (42 Hrs)

Overview and concepts of Decision Support and Systems (DSS): theoretical and practical aspects of DSS. Selected topics: managerial aspects of decision-making, the role of automation in decision making, and decision models. Concepts of design and development of decision support systems, and data management. Discuss integration and implementation challenges in Enterprise DSS, intelligent DSS, web-based DSS, as well as their future trends.

IIS 5213 Organization Management (42 Hrs)

Concepts and methods of organizational management: identify, apply, and evaluate techniques for structuring and resolving managerial problems in public organizations. Selected topics: the evolution of management thought; leadership; employee motivation; the impact of social, political, economic, and technological factors on managing; decision-making, strategic planning, controlling and organizing within an organization; and social responsibility.

IIS 5214 Strategic Management of Information Systems (42 Hrs)

Strategy and information technology concepts. Using IT for competitive advantage. Creating and Sustaining Competitive Advantage with Information Technology. Formulation of Information Systems Strategies. Implementing Information Technology Strategy. Strategy and Organisation. Exposure to both the theoretical and prescriptive knowledge to address the critical planning, organisational and control issues facing information systems in today's volatile economic environment. Focus on strategic information systems planning process using analytic techniques for evaluating strategic information systems plans.

IIS 5215 Strategies of Knowledge and Innovation (42 Hrs)

Strategic approach to Knowledge and Innovation Management (KIM); study the basic concepts and the strategic management processes of innovation and Knowledge Management (KM). Discuss the implementation of goals and tasks; external and internal analysis; choosing appropriate strategy; development of administrative and functional application planning; integration and control systems options; sustaining strategical process through structure and control mechanisms; measuring innovation; designing incentives to promote innovation; networked management of innovation. Focus on positioning the KM approach to develop corporate innovation strategies and to implement appropriate innovation process within the firm. Discuss specific context, the dynamics of innovation economy and globalization, and the role of national innovation and knowledge policies in the innovation economy.

IIS 5216 System Dynamics Modelling (42 Hrs)

System Dynamics Modelling concepts: overview of framework involving qualitative description, exploration and analysis of systemic problems: processes, business rules, information and boundaries, thereby facilitating quantitative computer simulation modelling and analysis to assist understanding of the underlying reasons for observed dynamic behaviour. Simulation of complex systems and run "what if" simulations to evaluate certain scenarios.

IIS 5217 Business Process Modelling**(42 Hrs)**

Fundamental concepts of business process modeling (BPM): the definition of a process, value of modeling systems, the process of building models, Business process modeling notation, context diagramming, functional decomposition with data flow modeling, and model verification and validation. Characteristics of a process-oriented application, business process analysis, basic design patterns for process control flow for tasks assembling, and standard graphical representations used to model a process. Overview of business process modeling standards such as Business Process Execution Language (BPEL) and Business Process Modeling Notation (BPMN) will also be included. Hands-on labs working with the state-of-the-art techniques used in support of business process redesign.

IIS 5218 Knowledge Management for E-Business**(42 Hrs)**

Knowledge management for e-business concepts; knowledge management (KM): from managerial and technical viewpoints in context of large organizations doing business over web and Internet. Selected topics: KM life cycle for knowledge creation, aggregation, dissemination, and sharing; ontology modeling, design, and engineering; role of standards such as XML, RDF, web services, and semantic web for e-business; business rules and reasoning engines; and digital rights management for e-business.

YEAR TWO: SEMESTER TWO**IIS 5221 Project****(480 Hrs)**

Each student will conduct his or her research with the approval and under the direction of the designated Departmental Course Coordinator. Prerequisites: Successful completion of all core ICT courses.

21. POSTGRADUATE DIPLOMA IN INFORMATION TECHNOLOGY SECURITY

1. INTRODUCTION

The Postgraduate Diploma in Information Technology Security (ITS) is a professional program that follows the project method of teaching which is designed to enable students to learn how to stay current and be abreast with the rapidly-evolving IT security field and cyber-crime activities. The project method provides students with the experience to apply core course materials to a substantial project in the workplace. Today network attacks, data breaches and advanced intrusions are occurring daily. Sensitive and confidential data and intellectual property are stolen from systems that are protected by sophisticated network and host based security. A motivated criminal group or nation state can and will always find a way inside enterprise networks. In the commercial, non-governmental and government sectors, hundreds of victims responded to serious intrusions costing millions of dollars and loss of untold terabytes of data. The latest cyber-attacks dubbed the Advanced Persistent Threat (APT) have proved difficult to suppress and are continuously racking havoc to private networks worldwide. The PGD in ITS seeks to train IT Security specialists to respond to and investigate these incidents and provide rapid countermeasures. It equips students with a firm understanding of advanced incident response and computer forensics tools and techniques to investigate data breach intrusions, tech-savvy rogue employees, advanced persistent threats, and complex digital forensic cases.

2. OBJECTIVES

The overall objective of the course is to train IT security graduates who are skilled, knowledgeable and motivated to manage enterprise network resources security needs. The specific objectives are:

- (a) To assess the security needs of computer and network systems,
- (b) To recommend safeguard solutions,
- (c) To equip students with skills needed to understand the implementation and enforcement of Information System Security Policies and Practices,
- (d) To manage the implementation and maintenance of security devices, systems, and procedures including security auditing standards and best practices, and
- (e) To motivate students to acquire up-to-date techniques required in identification, analysis, assessment and evaluation of information system threats and vulnerabilities and their impact on an organization's critical information infrastructures.

3. ADMISSION REQUIREMENTS

To qualify for admission into the Postgraduate Diploma (PGD) applicants shall be:

-) Holders of a computer science degree or related field from a recognized University.

4. COURSE STRUCTURE AND DURATION

The Postgraduate Diploma (PGD) program shall normally take 2-semester

Courses shall be offered in units. A course unit is defined as that part of a semester subject described by coherent syllabus and taught normally over a period of a semester. It is designated as a total of 42 hours of study in a semester. For this purpose, one 1-hour lecture is equivalent 2-hours tutorial or 3-hours practical or any combination as may be approved by the Board of the School of Informatics and Innovative Systems.

Part-time students shall be allowed to take not less than 50% of the courses prescribed for the year.

All course units will be taught for a total of 42 contact hours, including examinations except project work which will take 480 hours of practical work and project writing.

5. EXAMINATIONS REGULATIONS

Jaramogi Oginga Odinga University of Science and Technology Examinations rules and regulation shall apply.

6. COURSE DISTRIBUTION

Students shall choose courses and topics for their projects in consultation with Departmental Postgraduate Faculty Coordinator. All candidates shall be required to normally participate in the seminars arranged by the Department.

YEAR ONE: SEMESTER ONE

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	

IIT 4111	Principles of Computer Security	28	14	42	1C
IIT 4112	Network Security	28	14	42	1C
IIT 4113	Enterprise Systems Management & Security	28	14	42	1C
IIT 4114	Advanced Cryptography and Secure Communications	28	14	42	1C
IIT 4115	IT Security Capstone Research Project	0	42	42	1C
Total		112	98	210	5

YEAR ONE: SEMESTER TWO

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIT 4121	Information Systems Control and Audit	28	14	42	1C
IIT 4122	Computer Digital Forensics	28	14	42	1C
	Electives (Any 3 Electives)*				

ELECTIVES: - Any Three Electives.

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIT 4123	Legal Issues, Ethics and Incident Response in IT Security	28	14	42	1E
IIT 4124	Computer Security, Risk Management and Control	28	14	42	1E
IIT 4125	Strategic Information Systems Management	28	14	42	1E
IIT4126	Fundamentals of IT Security Law and	28	14	42	1E

	Policy				
IIT 4127	Information Security Policy and Compliance	28	14	42	1E
IIT 4128	Cybercrime Investigations	28	14	42	1E
IIT 4129	Advanced Linux/UNIX System Administration	28	14	42	1E

PROJECT

Course Code	Course Title	Contact Hours			Weight (Units)
		Lecture	Practical	Total	
IIT 4131	Project	0	84	84	2C

7. COURSE DESCRIPTION

YEAR ONE: SEMESTER ONE

IIT 4111 Principle of Computer Security (42 hrs)

Computer security overview: basics of computer security, including an overview of threat, attack and adversary models; social engineering; essentials of cryptography; traditional computing security models; malicious software; secure programming; operating system security in practice; trusted operating system design; public policy issues, including legal, privacy and ethical issues; network and database security overview.

IIT 4112 Network Security (42 hrs)

Network Security: weaknesses and vulnerabilities in network protocols (TCP/IP, ARP, DNS, ICMP, SMTP, Telnet, FTP, TFTP) and routing protocols. Footprinting and Intelligence gathering introduction to currently available tools. VPNs, Intrusion Detection Systems; Firewalls: Packet-filters, Application-Level, DMZ's. Introduction to Cisco Configmaker; Configuring a firewall. Introduction to Penetration testing. Network attacks; Denial of Service attacks, SQL injection, Cross-site scripting. Legal issues; Regulation of Investigatory Powers Act, Computer Misuse

Act, Police and Criminal Evidence Act. Overview of Digital Signatures and Message Digests, MD5, SHA. Network administration, Access control lists, VLANs. Introduction to network forensics investigations.

IIT 4113 Enterprise Systems Management & Security (42 hrs)

Concepts of enterprise security: Installation, administration and security in Windows and Linux/UNIX. Server hardware, energy management, virtual machines and hypervirtualization. Principles of authentication and access control, Kerberos, MAC, DAC and RBAC. Directory services, LDAP, NIS, Windows Active Directory, permissions, users, groups and roles. TCP, DNS servers, BIND. Web server installation, administration and security, Apache, IIS, proxy servers and web clients. SSL and TLS, creating and installing certificates, RSA, DSA, DES, MD5 and blowfish. Telnet, rsh, SSH and tunnels. FTP server installation, administration and security, SFTP. Database server installation, administration and security with MS SQL Server, MySQL and PostgreSQL. Email, SMTP, MUA, MTA, MSA, MDA, Sendmail, Procmail, Postfix, Exchange, POP, IMAP and Majordomo. System recovery: Backup technology, Storage Area Network (SAN), Network Attached Storage (NAS), Raid, Data Replication.

IIT 4114 Advanced Cryptography and Secure Communications (42 hrs)

Introduction to Number Theory and its application to cryptography; Advances and history of cryptographic techniques employed to secure data over time. Investigation of various encryption algorithms, from simple ciphers to modern public key encryption systems. Discussion of various crypto-algorithms. Algorithm complexity, advanced number theory (Galois fields, quadratic residues, zero knowledge schemes, one-time signatures), efficient implementation of encryption schemes in hardware and software and other advanced topics in cryptography.

IIT 4115 IT Security Capstone Research Project (42 hrs)

This course provides the student the opportunity to put into practice all the skills learned to this point. Emphasis on: security policy, process planning, procedure definition, business continuity, and systems security architecture. Upon completion, students should be able to design and implement comprehensive information security architecture from the planning and design phase through implementation. Selected topic: Information Systems Security, the Information Systems Security/Operating Systems, and the Information Systems Security/Security Hardware issues.

YEAR ONE: SEMESTER TWO

IIT 4121 Information Systems Control and Audit (42 hrs)

Trends and advances in information systems audit and controls. Cryptographic algorithms, protocols and applications. Secure e-commerce. Cryptosystems: basic hash checksums, symmetrical and asymmetrical cryptography algorithms, basic protocols and standards like RSA and SSL, digital signatures and digital cash, the concept of a PKI and X509 certificates, and various crypto-software applications. Computer security and controls to information systems: authentication and access control, protection against malicious code and coders, database security, formal models, and policy issues, Computer crime and abuse, Risk management. Layered protection mechanisms for secure web-based client/server systems on the Internet. Auditing processes; auditing transaction databases: auditing methodology, evaluation of secure financial transactions, and detections of unauthorised access.

IIT 4122 Computer Digital Forensics (42 hrs)

Latest advances in cybercrime activities; digital forensics: crime scene investigation and processing, forensic science and computer forensics topics. Selected topics: crime scene procedures and documentation, collecting and preserving integrity of evidence to present to court, computer forensic science, locating digital evidence (e.g., computer systems, networks, wireless communications, and storage devices), and basic legal principles related to computer forensics. The role of computer forensics specialist in cyber-crime investigations: incidence response techniques; determination of losses and compromises to the security of enterprise information. E-discovery tracking and reporting techniques.

IIT 4123 Legal Issues, Ethics and Incident Response in IT Security(42 hrs)

Advances in IT incidence response techniques; practical approach for responding to computer incidents, a detailed description of how attackers undermine computer systems in order to learn how to prepare, detect, and respond to them. Concepts of risk management; explore the ethics and legal issues associated with responding to computer attacks: employee monitoring, working with law enforcement, and handling evidence. Focus in particular on practical, computer-assisted techniques for risk-related modeling and calculations. Identification of threats through Hazard and Operability Analysis [HAZOP] and PHA (Process Hazards Analysis, probabilistic techniques for estimating the magnitude and likelihood of particular loss outcomes.

IIT 4124 Computer Security, Risk Management and Control (42 hrs)

Fundamentals of IT security risk management and control. Explore the threats and risks present in organizations due to the pervasive use of technology. Concepts of risk evaluation techniques and identify security and control techniques used to minimizing threats and risk to the organization's network infrastructure. Selected topics on computer and information security: threat techniques, protective techniques, risk analysis, contingency planning and incidence response, password techniques, encryption, network protocol, and intercept devices. Case studies of latest risk associated with cyber-attacks and cyber-crime activities. Capstone term project/paper research on network cyber-activities.

IIT 4125 Strategic Information Systems Management (42 hrs)

Introduction; information systems strategy and management: business models and organization forms in the information age, IT as a business enabler, IT and competitive strategy, information for management control, analysis and redesign of business structure and processes, knowledge management and information networks, interorganizational networks, sourcing strategies, interfacing with the IT function, reliability and security, and ethical and policy issues. Advances in security management in information systems and networks. Intrusion detection systems, intrusion prevention systems, anomaly detection, network forensics, application monitoring and logging, auditing and data management, contingency planning, digital immune systems; alarm and responses; security standards; ethical and legal issues in information; cyber-evidence. Case studies.

IIT 4126 Fundamentals of IT Security Law and Policy (42 hrs)

Overview and introduction to Law, IT Security and Policy; survey the existing/general legal issues that must be addressed in establishing institutional InfoSec standards and best practices. Canvasses the many new laws on data security, and evaluates InfoSec as a field of growing legal liability. Focus on: computer crime and intellectual property laws when a network is compromised, emerging topics like honeypots, and active defenses, i.e., enterprises hacking back against hackers. Study on impact of future technologies on law and investigations.

IIT 4127 Information Security Policy and Compliance (42 hrs)

Latest advances in organizational security policy and compliance. Legal and privacy issues; Concepts of organizational security policies; Evaluation tools: standards and best practices. Procedures and processes required to enforce policy and compliance. Techniques: install, monitor and audit key information security regulatory requirements: SOX, PCI, HIPAA, GLBA & best practices like COBIT, ITIL and ISO17799.

IIT 4128 Cybercrime Investigations (42 hrs)

Introduction to cybercrimes investigations techniques: unauthorized access, mischief to data, possession of hacking tools, possession of child pornography. Legal aspects: organization legal issues, Kenyan judicial system, computer crime laws, rights of citizens, common law, mutual legal assistance treaty, search warrants, production and assistance orders, international laws, upcoming legal changes; Investigation process: search planning, acquisition methods, environment recognition, evidence identification. Reporting process: investigation and analysis reports, notes taking; Authority of seizure; Forensic Interviews; Computer crime trials: witness preparation, court sentencing, rebuttal witness, cross-examination, testimony, credibility attacks; Real world issues case studies. Students will undertake a capstone research project on cybercrime activities in Kenya and laws that govern it.

IIT 4129 Advanced Linux/UNIX System Administration (42 hrs)

Overview and concepts of DNS (domain name system) servers and the Apache Web server (httpd). Fundamental concepts of LDAP (lightweight directory access protocol) directory queries and authentication. Administration and configuration of server-side programming tools (e.g., CGI, mod_perl, PHP, JSP, Jakarta Tomcat, and Java SDK). Setup and configure: SAMBA, FTP, Telnet, and SQUID proxy servers. SMTP (simple mail transfer protocol) theory implemented via Sendmail and Postfix e-mail systems. E-mail protocols such as IMAP and POP are configured;

spam filtering techniques. Discuss next generation networks, applications, and services: Voice over IP (VoIP), Instant Messaging (IM), Streaming media (unicast, broadcast, and multicast), and peer-to-peer networking.

IIT 4131 Project

(84 hrs)

Each student will conduct his or her research with the approval and under the direction of the designated Departmental Course Coordinator. Prerequisites: Successful completion of all core Information Technology Security Specialist (ITSS) courses.