STAGE-6

S-602 - INFORMATION SYSTEMS AND IT AUDIT

i. Introduction:
This course deals with management of security of the systems, and is designed to focus on tools and techniques of information systems and application of knowledge to I.T. Audit.

ii. Objectives:
To provide the students with a detailed knowledge of Information System and I.T. Audit to enabling them to:
- design and develop information system to improve the performance of organisations, and
- apply conceptual approach of information systems to I.T. Audit.

iii. Outcomes:
On completion of this course, students should be able to:
- demonstrate an understanding of the complexity of managing security in electronic systems,
- identify and assess the critical threats to information systems,
- perform preliminary security audit of information systems and apply skills to a security incident, and
- apply the most effective information systems audit, control and security practices.

INDICATIVE GRID

SYLLABUS CONTENT AREA	WEIGHTAGE
SECTION-A **INFORMATION SYSTEM** 1. Moving Towards E-business 2. Understanding Systems from a Business Viewpoint 3. Business Processes 4. Information and Data-bases 5. Customer, Product, and E-commerce 6. Artificial Intelligence 7. Information Systems Planning 8. Building and Maintaining Information Systems 9. Security and Ethical Challenges 10. Lab Sessions: Spreadsheets for Modeling and Forecasting	50%
SECTION-B **I.T. AUDIT** **AUDITING IN I.T. ENVIRONMENT** 11. Information Systems, Audit Process and Internal Control 12. Management, Planning and Organisation of Information System; 13. Auditing Infrastructure and Operations; 14. Protection/Security of Information Assets; 15. Disaster Recovery and Business Continuity Planning 16. Auditing Development, Acquisition and Maintenance	50%
TOTAL	**100%**

Note: The weightage shown against each section indicates, study time required for the topics in that section. This weightage does not necessarily specify the number of marks to be allocated to that section in the examination.

CONTENTS

SECTION-A

INFORMATION SYSTEM

1. Moving Towards E-Business
Definition of business; definition of work systems; information systems and E-business; business processes; functional areas and the value-chain; E-commerce business models; E-business assumptions; phases in building and maintaining systems; information technology as driving force for innovation; obstacles when applying IT in the real world.

2. Understanding Systems from a Business Viewpoint
Frameworks and models; the work system framework; work system principles; relationship between work systems and information systems; principle-based systems analysis (PBSA) method; measuring work system performance.

3. Business Processes
Process modeling; data flow diagrams (DFDs); flowcharts and pseudo code; process characteristics; business process performance variables; basic communication concepts; basic decision-making concepts.

4. Information and Data-bases

What is a data-base? data modeling; types of data-bases; the roles of a data-base management system; data as a resource; the importance of models. Information systems categories; office automation systems; communication systems; transaction processing systems; management and executive information systems; decision support systems; enterprise systems; limitation and uses of information systems categories.

5. Customer, Product, and E-commerce

Three dimensions of products and services; the customer experience; the customer's criterion for evaluating products and services; product customisation and adaptability; information systems as a competitive advantage; mission-critical and strategic information systems; challenges for e-commerce.

6. Artificial Intelligence

Future trends including advances in artificial intelligence.
Business and AI
The Domains of AI
Neural Networks
Fuzzy Logic Systems
Genetic Algorithms
Virtual Reality
Intelligent Agents
Expert Systems
Value of Expert Systems

7. Information Systems Planning

The importance of IS planning; project management; strategic-level vs. project-level planning; business maxims and IT maxims; centralised vs. decentralised IS architecture; cost/benefit analysis of information systems.

8. Building and Maintaining Information Systems

Four phases of any information system: initiation, development, implementation and operation and maintenance; alternative processes for building information systems: traditional life cycle, prototypes, application packages, and end-user development; advantages and disadvantages of each approach; deciding on a combination of methods to use.

9. Security and Ethical Challenges

- Ethical Responsibility of Business Professionals (Business Ethics, Technology Ethics and Ethical Guidelines).
- Computer Crime (Hacking, Cyber Theft, Unauthorized Use at Work, Software Piracy, Piracy of Intellectual Property, Computer Viruses and Worms)
- Privacy Issues (Privacy on Internet, Computer Matching, Privacy Laws, Computer Libel and Censorship)
- Other Challenges (Employment Challenges, Computer Monitoring, Challenges in Working Conditions, Challenges to Individuality) Health Issues (Ergonomics)
- Internet worked Security defenses (Encryption, Firewalls, Denial of Service Defenses, e-Mail Monitoring, Virus Defenses)
- Other Security Measures (Security Codes, Backup Files, Security Monitors, Biometric Security, Computer Failure Controls, Fault Tolerant Systems, Disaster Recovery).

10. Lab Sessions: Spreadsheets for Modeling and Forecasting (6 Hrs)

a) Using spreadsheets as a decision support tool, developing financial and forecasting models, regression analysis, capital budgeting. Students need to have competency in the use of advanced built-in functions and accounting related extensions to the spreadsheet package such as what-if analysis, goal seeking, auditing and other tools. Competency in developing a decision support/forecasting implementation of a business problem on a spreadsheet.

b) **Optimisation**

Linear optimisation; linear programming; sensitivity analysis; linear programming applications; integer optimisation; non-linear optimisation.

SECTION-B

I.T. AUDIT

11. Information Systems, Audit Process and Internal Control

Audit mission, planning, laws and regulations' effect on Information System (IS) audit planning; code of professional ethics; auditing standards and guidelines; corporate governance. Role and responsibilities of internal, external and information technology (IT) auditors; risk analysis: evaluation and elements of risks; category of audit risk; risk-based audit approach; risk assessment techniques; audit objectives; compliance and substantive testing; evidence and sampling; internal control: objectives, procedures and classifications; cost effectiveness and controls; computer-assisted audit techniques and its need and functional capabilities; continuous on-line audit approach; audit documentation: constraints on the conduct of audit; project management technique; control self-assessment; performance IS audit; definition, classification, procedures, methodology and phases of IS audit; evaluation of audit strength and weakness; judging the materiality of

findings; communicating audit results; audit report structure and contents.

12. Management, Planning and Organisation of Information System

Reviewing the IS strategy: planning, policies, procedures and management practices; review of IS organisational structure and responsibilities; segregation of IS and other organisational functions; auditing the management, planning and organisation of IS.

Case Study
Review of IT Planning/Strategy

13. Auditing Infrastructure and Operations

Hardware review; operating systems reviews; data-base reviews; local area network reviews; network operating; control reviews; information system operations reviews; lights out operations; application controls and their objectives; file creation; data conversion; input and output; problem management reporting reviews; hardware availability and utilising reporting reviews; scheduling reviews.

Case Study
Review of the infrastructure of a selected organisation.

14. Protection/Security of Information Assets

Logical access exposures; logical access software control policy: issues, features, tools and procedures; passwords, logs, audit trails, biometrics, dial-back, safeguards, token devices and other tools; network infrastructure security: local area network, client/server, internet threats and security, encryption, firewalls, instruction detection systems; auditing network infrastructure security; environmental exposure and controls: water, fire, smoke, power, wiring, emergencies etc.; physical access exposures, controls and audit.

Case Study
Review of the protection/security of information assets of a selected organisation.

15. Disaster Recovery and Business Continuity Planning

Disaster and other disruptive events and components of an effective continuity planning; recovery alternatives and off-site libraries: controls, security, media, procedures, records; testing of recovery plans: specification and execution of tests; auditing of disaster recovery plans and their pre and post-evaluations.

16. Auditing Development, Acquisition and Maintenance

Risk of inadequate system development life cycle (SDLC) and review of development procedures and methodologies; review of acquisition process for outsourcing; information system maintenance practices: change management, library control software, review of the practice of project management tools and techniques.

CORE READINGS		
TITLE	**AUTHOR**	**PUBLISHER**
Information Systems: The Foundation of E-Business, 4/Edition	Steven Alter	Prentice Hall International Inc.,
Decision Modelling with Microsoft Excel, 6/Edition	Jeffrey H. Moore, Stanford University Larry R. Weatherford	University of Wyoming, Prentice Hall.
CISA Review Manual	CISA	Information Systems Audit and Control Associations, Inc., 3704 Algonquin Road, Suite 1010 Rolling Meaduals, Illinois 60008, USA.
Spreadsheet/MS Excel Package	Microsoft Corporation	Microsoft Corporation, New York.
IFAC Guidelines on IT	_____	International Federation of Accountants, 545, Fifth Avenue, 14th Floor, New York, NY 10017.
ADDITIONAL READINGS		
Introduction to Information System	James O' Brien	McGraw Hill, Irwin, New York.
Practical IT Auditing	James R. Hickman	Warren Gorham & Lamont RIA Group, 117 East Stenens avenue Vahalla, New York 10595.
Information Technology for Business Executives	Prof. Dr. Khawaja Amjad Saeed	Institute of Business Management, G.P.O. Box No. 1164, Lahore.
Principles of Auditing	Prof. Dr. Khawaja Amjad Saeed	Institute of Business Management, G.P.O. Box No. 1164, Lahore.