IT1105- Information Systems & Technology

INTRODUCTION

This is one of the 4 courses designed for Semester 1 of Bachelor of Information Technology (BIT) Degree program. Information Systems and Technology course aims to develop an understanding of the components of Computer Based Information Systems (CBIS), their functions and types of CBIS used in organizations. Furthermore, it aims to provide a general understanding of the Information Systems (IS) development process as well as ethical and security issues associated with the use of information systems.

CREDITS: 03

LEARNING OUTCOMES

After successful completion of this course students will be able to:

- Describe the components of a computer based information systems.
- Explain different types of information systems and their use.
- Describe the IS development process.
- Describe management challenges/issues associate with the use of computer based information systems as well as methods that can be used to prevent these challenges/issues.

MINOR MODIFICATIONS

When minor modifications are made to this syllabus, those will be reflected in the Virtual Learning Environment (VLE) and the latest version can be downloaded from the relevant course page of VLE. Please inform your suggestions and comments through the VLE. http://vle.bit.lk

ONLINE LEARNING MATERIALS AND ACTIVITIES

You can access all learning materials and this syllabus in the VLE: http://vle.bit.lk, if you are a registered student of BIT degree program. It is very important to participate in learning activities given in the VLE to learn this subject.

ONLINE ASSIGNMENTS

The assignments consist of two quizzes, assignment quiz 1 (It covers the first half of the syllabus) and assignment quiz 2 (It covers the second half of the syllabus). Maximum mark for a question is 10, minimum mark for a question is 0 (irrespective of negative scores). Final assignment mark is calculated considering 40% of assignment quiz 1 and 60% of assignment quiz 2. Pass mark for the online assignments in a course is 50. You are advised to do online assignments before the final exam of the course. It is compulsory to pass all online assignments to partially qualify to obtain year 1 certificate.

FINAL EXAMINATION

Final exam of the course will be held at the end of the semester. Each course in the semester 1 is evaluated using a two hour question paper which consists of 40-60 MCQs.

OUTLINE OF SYLLABUS

Topic	Hours
1. Introduction to Information Systems (ISs)	6
2. Hardware and Software of Computer based Information Systems (CBIS)	6
3. Organizing Data and Information	6
4. Organizations and Information Systems	6
5. Business Information Systems	16
6. System Development	10
7. Security, Privacy and Ethical Issues	10
TOTAL	**60**

REQUIRED MATERIALS

Main Reading:

Ref 1: Stair, R., & Reynolds, G. *Principles of information systems*. 8th Edition: Thomson Course Technology. (Indian Edition)
[Stair, R., & Reynolds, G. Information Systems. 10th Edition: Cengage Learning. (Indian Edition) is also available.]

Ref 2: O'Brien, J. (2005). *Introduction to information systems.* 12th Edition: Tata McGraw-Hill Publishing Company Limited.

Online References:

Ref 3: http://www.icta.lk

DETAILED SYLLABUS

1 Introduction to Information Systems (ISs) (6 hrs)

Instructional Objectives

- Distinguish data from information
- Describe the characteristics used to evaluate the quality of information
- Identify system concepts
- Describe the components of an information system
- Describe the components of a computer based information system
- Identify the role of IS in business
- Describe the importance of studying information systems
- Identify Information Systems careers

Material /Sub Topics

1.1 Information Concepts
- 1.1.1 Data vs. Information (Ref 1: pg.5-7)
- 1.1.2 The Characteristics of Valuable Information (Ref 1: pg.708)
- 1.1.3 The Value of Information (Ref 1: pg.8-9)

1.2 Information System
- 1.2.1 System Concepts and Components (Ref 1: pg.8)
- 1.2.2 Main Components of an Information System (Ref 1: pg.11-12)
- 1.2.3 Computer Based Information Systems
  - 1.2.3.1 Hardware (Ref 1: pg.13)
  - 1.2.3.2 Software (Ref 1: pg.14)
  - 1.2.3.3 Databases (Ref 1: pg.14)
  - 1.2.3.4 Telecommunications, Networks and the Internet (Ref 1: pg.14-15)
  - 1.2.3.5 People (Ref 1: pg.16)
  - 1.2.3.6 Procedures (Ref 1: pg.16)* (* in Ref 2, procedures are mentioned under software)

1.3 The role of IS in business

1.4 Importance of Learning Information Systems
- 1.4.1 Why learn IS (Ref 1: pg.28-30)
- 1.4.2 Information Systems Careers (Ref 1: pg.63-69)

2 Hardware and Software of Computer based Information Systems (CBIS) (6 hrs)

Instructional Objectives

- Identify the role of the CPU and memory in a computer system
- Identify secondary storage devices
- Identify different input/output devices and their use
- Describe how application software can support personal, workgroup and enterprise business objectives
- Describe the pros and cons of proprietary (bespoke) software and off-the-shelf software
- Identify the basic role of system software
- Identify key issues and trends of software that have an impact on organisations and individuals

Material /Sub Topics

2.1 Overview of Hardware of a Computer System (Ref 1: pg.84) (student manual)
2.2 Application Software
- 2.2.1 Overview of Application Software
- 2.2.2 Types of Application Software (Ref 1: pg.146-147)
- 2.2.3 Functions of Application Software
  - 2.2.3.1 Personal Application Software (Ref 1: pg.147-153; Ref 2: pg.106-111)
  - 2.2.3.2 Workgroup Application Software (Ref 1: pg.154)
  - 2.2.3.3 Enterprise Application Software (Ref 1: pg.154-155)
  - 2.2.3.4 Application Software for Decision Support and Specialised Purpose (Ref 1: pg.155)

2.3 Basic Role of System Software in CBIS
2.4 Software Issues and Trends
- 2.4.1 Software Bugs (Ref 1: pg.160)
- 2.4.2 Copyright and Licenses (Ref 1: pg.160)
- 2.4.3 Open Source Software (Ref 1: pg.160-162)
- 2.4.4 Software Upgrades (Ref 1: pg.163)
- 2.4.5 Global Software Support (Ref 1: pg.164)

3 Organizing Data and Information (6 hrs)

Instructional Objectives

- Define general data management terms
- Identify advantages and disadvantages of the database approach to data management
- Identify different database models
- Identify some current database applications

Material /Sub Topics

3.1 Data Management
- 3.1.1 Introduction to DBMS
- 3.1.2 The Hierarchy of Data (Ref 1: pg.177-178)
- 3.1.3 Data Entities, Attributes, and Keys (Ref 1: pg.178-179)
- 3.1.4 Traditional Approach to Data Management (Ref 1: pg.179-181)
- 3.1.5 Database Approach to Data Management (Ref 1: pg.179-181)
- 3.1.6 Advantages/disadvantages of Database Approach
- 3.1.7 Types of DBMS: Hierarchical/Network oriented/relational/Object oriented DBMS (Ref 1: pg.182-184)

3.2 Database Management Systems and Applications
- 3.2.1 Popular Database Management Systems (Ref 1: pg.194)
- 3.2.2 Linking the Company Database to the Internet (Ref 1: pg.196-197)
- 3.2.3 Data Mining Applications (Ref 1: pg.197-201; Ref 2: pg.143-146)
- 3.2.4 Business Intelligence (Ref 1: pg.202)
- 3.2.5 Important factors when Selecting a Database Management System (Ref 1: pg.195-196)

4 Organizations and Information Systems (6 hrs)

Instructional Objectives

- Define the terms organization and competitive advantage
- Identify the processes in the value chain

- Describe the role of Information System in different functional areas of Business and in different industries
- Describe how organizations are using Information Systems to gain competitive advantage
- Identify the strategic uses of Information Systems
- Define virtual organisation and reengineering
- Describe the role of the network in an organisation
- Identify some of the network trends and business value they generate

Material /Sub Topics

4.1 Organizations
4.2 The Fundamental Role of IS in Business (Ref 2: pg.8)
- 4.2.1 Information Systems in Functional Areas of Business (Ref 1: pg.30)
- 4.2.2 Information Systems in Different industries (Ref 1: pg.30)

4.3 Competitive Advantage and Strategic Information Systems
- 4.3.1 Introduction to Competitive Advantage (Ref 1: pg. 56) (student manual)
- 4.3.2 Competitive Forces and Strategies
- 4.3.3 Use of IT to Support Competitive Strategies (Ref 2: pg.42-44)
- 4.3.4 The Value Chain and Strategic IS
- 4.3.5 Other Strategic Uses of IT
  - 4.3.5.1 Building a Customer Focused Business (Ref 2: pg.48-49)
  - 4.3.5.2 Reengineering Business Processes (Ref 2: pg.50-51)
  - 4.3.5.3 Improve Agility (Ref 2: pg.52-54)
  - 4.3.5.4 Develop Virtual Organisations (Ref 2: pg.54-55)
  - 4.3.5.5 Improve Knowledge Creation (Ref 2: pg.56-57)

4.4 Role of networks in organizations (see student manual)
4.5 Communication Networks and the business value they generate
- 4.5.1 Business value of telecommunication networks (see student manual)
- 4.5.2 Business value of the Internet (Ref 2: pg.174-177)
- 4.5.3 Business value of Intranets (Ref 2: pg.178-179)
- 4.5.4 Business value of Extranets (Ref 2: pg.180-181)

5 Business Information Systems (16 hrs)

Instructional Objectives

- Identify basic activities and business objectives common to all transaction processing systems (TPSs)
- Describe some key control and management issues associated with a TPS
- Identify the inputs and outputs for the transaction processing systems associated with order processing, purchasing and accounting business process
- Define the term MIS (Management Information System)
- Distinguish the difference between a TPS and a MIS
- Describe the inputs and outputs associated with different types of MIS
- List and discuss the important characteristics of DSSs (Decision Support Systems)
- Identify and describe the basic components of a DSS
- Describe the characteristics of Group Support Systems (GSS) and Executive Support Systems (ESS)
- Identify uses of GSS and ESS
- Define the term Artificial Intelligence and identify its major application areas

Material /Sub Topics

5.1 Transaction Processing System (TPS)
- 5.1.1 Overview of TPS (student manual)
- 5.1.2 Types of Transaction Processing methods (Ref1: pg.346-347)
  - 5.1.2.1 Batch Processing
  - 5.1.2.2 Online Processing
- 5.1.3 Organisational Objectives of a TPS (Ref 1:pg. 348)
- 5.1.4 Activities in a TPS (Ref 1: pg.349-354)
- 5.1.5 Control and Management of a TPS (Ref 1:pg. 354)
- 5.1.6 TPS Applications (Ref 1: pg.357-362)

5.2 Management Information Systems (MIS)
- 5.2.1 Overview of MIS (Ref 1: pg.388-392)
- 5.2.2 Characteristics of a MIS (Ref 1: pg.392-393)
- 5.2.3 MIS in Functional Areas of Business
  - 5.2.3.1 Financial MIS (Ref 1: pg.396-397)
  - 5.2.3.2 Marketing MIS (Ref1: pg.400-402)
  - 5.2.3.3 Human Resource MIS (Ref 1: pg.404-405)
  - 5.2.3.4 Manufacturing MIS (Ref 1: pg.397-400)

5.3 Decision Support Systems (DSS)
- 5.3.1 Introduction to DSS (Ref 1: pg.406-408; Ref 2: pg.301-304)
- 5.3.2 Capabilities of a DSS (Ref 1: pg.409-410; Ref 2: pg.304-307)
- 5.3.3 Basic Components of a DSS (Ref 1: pg.410-413)
- 5.3.4 Comparison of MIS and DSS (Ref 1: pg.410-411)
- 5.3.5 Group Support Systems (GSS) (Ref 1: pg.413-415)
- 5.3.6 Executive Support Systems (ESS) (Ref 1: pg.417-420; Ref 2: pg.308-309)

5.4 Other Specialized Information Systems
- 5.4.1 An overview of Artificial Intelligence (Ref 1: pg.437 -445; R2: pg.316)
  - 5.4.1.1 Introduction to other Application Areas of Artificial Intelligence (Ref 2: pg.316-324; Ref 1: pg.445)

6 System Development (10 hrs)

Instructional Objectives

- Define the term information systems planning and identify reasons for initiating a systems development project
- Identify the different stakeholders in the system development process
- Identify different approaches to system development
- Identify the different phases of traditional System Development Life Cycle (SDLC)
- Describe the advantages/disadvantages of in-house development vs. outsourcing

Material /Sub Topics

6.1 An Overview of Systems Development
- 6.1.1 Introduction (Student manual)
- 6.1.2 Participants in Systems Development (Ref 1: pg.479-480)
- 6.1.3 Initiating Systems Development (Ref 1: pg.480-481)
- 6.1.4 Information Systems Planning

6.2 Different approaches to Systems Development
- 6.2.1 The Traditional Systems Development Life Cycle (Ref 1: pg.487-488)
- 6.2.2 Prototyping (Ref 1: pg.488-490)
- 6.2.3 Rapid Application Development (Ref 1: pg.490-491)
- 6.2.4 End User System Development (Ref 1: pg.491-492)

6.3 Phases in the Traditional Systems Development Model
- 6.3.1 Systems Investigation and Analysis
  - 6.3.1.1 Data Collection (Ref 1: pg.506-507)
  - 6.3.1.2 Requirement Analysis (Ref 1: pg. 507)
- 6.3.2 System Design
  - 6.3.2.1 Logical and Physical Design (Ref 1: pg.526-527)
- 6.3.3 Factors Considered during Implementation
- 6.3.4 System Maintenance and Review
  - 6.3.4.1 Types of Reviews (Ref 1: pg.556)
  - 6.3.4.2 Factors Considered during System Review (Ref 1: pg.557)
  - 6.3.4.3 Advantages/Disadvantages of developing In-house vs. Outsourcing

7 Security, Privacy and Ethical Issues (10 hrs)

Instructional Objectives
- Describe some examples of waste and mistakes in an IS environment, their causes, and possible solutions
- Describe the types and effects of computer crime
- Discuss the principles and limits of an individual's right to privacy
- Identify ethical dimensions and important ethical issues associated with the use of computers
- Identify types of security management strategies and defences and describe how they can be used to ensure the security of business applications of IT
- Describe ethical responsibilities of IT Managers and users in the work environment

Material /Sub Topics
7.1 Computer Related Wastes, Mistakes
- 7.1.1 Computer Related Wastes and mistakes (Ref 1: pg.576-577)
- 7.1.2 Preventing Computer Related Waste and Mistakes (Ref 1: pg.580-591)

7.2 Privacy
- 7.2.1 Privacy Issues (student manual)
- 7.2.2 Internet Privacy, Laws and Regulations (Ref 1: pg.598-602, pg. 382-383)
- 7.2.3 Fairness in Information Use (Ref 1: pg.599)

7.3 Security Threats/Computer Crime
- 7.3.1 Malicious Software
- 7.3.2 Hacking and Cyber vandalism
- 7.3.3 Spoofing and Sniffing
- 7.3.4 Denial of Service Attacks
- 7.3.5 Identity Theft
- 7.3.6 Phishing
- 7.3.7 Internal Employees

7.4 Measures to Address Security Concerns
- 7.4.1 Technologies and Tools Used for Security and control
- 7.4.2 Security Policy (Ref 2: pg.407-410)
- 7.4.3 Security Audit (Ref 2: pg.411-412)

7.5 Ethical Issues
- 7.5.1 Overview of Ethical Dimensions (student manual)
- 7.5.2 Business and Technology Ethics (Ref 2: pg.380-382)