IT2403 Systems Analysis and Design (Compulsory)

BIT – 1st YEAR – SEMESTER 2

INTRODUCTION

This is one of the 4 courses designed for Semester 2 of Bachelor of Information Technology Degree program.

CREDITS: 04

LEARNING OUTCOME

After successfully completing this module you will be able to:

- Describe fundamental concepts and trends that provide the context of Systems Analysis and Design methods and to apply the techniques practically to analyze and design an information system.

OUTLINE OF SYLLABUS

Topic	Minimum number of hours
• Introduction to Information System Environment	05
• System Development Life Cycle	04
• Problem Definition	06
• Requirements Analysis	10
• Modeling Methods	22
• System Design	09
• Project Management	02

• Automated Tools and Technology	02
Lectures	60
Total for the subject	**60**

REQUIRED MATERIALS

Main Reading:

1. Systems Analysis and Design Methods by Jeffrey L. Whitten and Lonnie D. Bentley, 7th edition, ISBN 0-07-063417-3, Tata McGraw-Hill, 2007.
2. http://www.mhhe.com/whitten

Supplementary Reading:

3. Introduction to System Analysis and Design by Igor Hawryszkiewycz, 4th edition, Prentice-Hall, 1998.

DETAILED SYLLABUS

1. Introduction to Information System Environment (5 hrs.)

Instructional Objectives

- Identify the problems in legacy systems
- Identify the various types of Information Systems and list their characteristics
- Recognize the various two types of processing modes

Material /Sub Topics

1.1 Information Systems (Ref 1 p7– p16)
  1.1.1 Stakeholders: Systems users, Systems owners, Systems designers, Systems builders, Systems analysts
  1.1.2 Legacy Systems (Refer Learning material)
1.2 Types of Information Systems (Ref 1 p6-p7)
  1.2.1 Transaction Processing System
  1.2.2 Management Information System
  1.2.3 Decision Support System
  1.2.4 Executive Information Systems
  1.2.5 Expert Systems
  1.2.6 Communications and collaboration Systems
  1.2.7 Office Automation Systems
1.3 Architecture based classification of Information Systems (Ref 1 p483 -p494)
  1.3.1 Centralized Systems
  1.3.2 Distributed Systems
    1.3.2.1 File server architecture

1.3.2.2 Client-server architecture
1.3.2.3 Internet based architecture
1.4 Processing Types (Ref 1 p584)
1.3.1 Batch Processing
1.3.2 Online Processing

2. System Development Life Cycle (SDLC) (4hrs.)

Instructional Objectives

- State the importance of SDLC in System Development
- Describe the phases of a Sequential SDLC
- State the importance of an iterative life cycle
- Identify general principles behind all System Development Methodologies
- Outline the major components of the systems development

Material /Sub Topics

2.1 Sequential development approach (Ref 1 p89– p91, Refer Learning material)
2.1.1 Sequential development Phases
2.1.2 Problems with waterfall development approach
2.1.3 Modified waterfall model
2.2 Iterative development approach (Ref1 p92)
2.3 Systems Development
2.3.1 Underlying Principles for Systems Development (Ref1 p72-p76)
2.3.2 Major components of System Development (Refer Learning material)
2.3.2.1 Methodologies
2.3.2.2 Modeling Methods
2.3.2.3 Tools
2.3.3 Life cycle Vs. Methodology (Ref1 p70-p71)

3. Problem Definition (6hrs.)

Instructional Objectives

- Define problems, opportunities and directives
- Describe the scope definition in terms of data, business processes, and interfaces
- State the importance of the Feasibility Study
- Identify the different tests used for feasibility
- List the methods of analyzing the feasibility of Candidate Systems
- Identify the important concepts of writing reports and presentations

Material /Sub Topics

3.1 Problem discovery and Scope definition
3.1.1 Where do System development projects come from (Ref1 p77)
3.1.2 Define scope in terms of Data, Processes and Interfaces (Ref1 p167-p172)
3.1.3 Problem discovery and analysis (Ref1 p210-p212)
3.2 Feasibility Study (Ref1 p414-p419)
3.2.1 Introduction

3.2.2 Tests for Feasibility
3.2.2.1 Operational Feasibility
3.2.2.2 Cultural (or political) feasibility
3.2.2.3 Technical Feasibility
3.2.2.4 Schedule Feasibility
3.2.2.5 Economic Feasibility
3.2.2.6 Legal Feasibility
3.3 Cost Benefit Analysis (Ref1 p419-p426)
3.4 Feasibility Analysis of candidate systems (Ref1 p426-430)
3.4.1 Candidate systems matrix
3.4.2 Feasibility Analysis Matrix
3.5 The System Proposal (Ref1 p431-p437)
3.5.1 Written report
3.5.2 Formal presentation

4. Requirements Analysis (10hrs.)

Instructional Objectives

- Describe the importance of communication skills for gathering requirements for systems development
- Distinguish between the user desires and user requirements
- Identify different fact gathering techniques and list the advantages and disadvantages of each
- Draw a Document flow diagram for a given scenario

Material /Sub Topics

4.1. Identifying Requirements (Ref1 p208-p234)
4.1.1. Process of requirement Discovery
4.1.1.1 Requirements discovery
4.1.1.2 Documenting and analyzing requirements
4.1.1.3 Requirements management
4.1.2. Fact finding techniques
4.1.2.1 Sampling of existing documentation
4.1.2.2 Research and site visits
4.1.2.3 Observation of the work environment
4.1.2.4 Questionnaires
4.1.2.5 Interviews
4.1.2.6 Prototyping
4.1.2.7 Joint Requirements Planning
4.2 Document Analysis (Refer Learning material)
4.2.1 Documents of a System
4.2.2 Document Flow Diagrams
4.2.2.1 Physical movement of documents
4.2.2.2 Usefulness of Document flow diagrams

5. Modeling Methods (22hrs.)

Instructional Objectives

- Identify the differences among process modeling, data modeling, and object modeling
- Identify the components of modeling methods; Data Flow diagrams, Entity Relationship Diagrams
- Describe the usage of modeling methods
- Identify the errors of an example diagram of a modeling method.
- Apply process modeling and data modeling in analyzing a system based on a given scenario.

Material /Sub Topics

5.1 Process Modeling (Ref1 p316-p360)
- 5.1.1 Introduction to process modeling
  - 5.1.1.1 Logical models
  - 5.1.1.2 Physical models
- 5.1.2 Data Flow Diagrams
- 5.1.3 Functional Decomposition Diagrams
- 5.1.4 Event diagrams
- 5.1.5 Process Descriptions
  - Structured English, Decision Tables, Decision Trees

5.2 Data Modeling (Ref1 p270-p283)
- 5.2.1 Entities
- 5.2.2 Attributes
- 5.2.3 Relationships

5.3 Synchronization of System Models (Ref1 p359-p360)
5.4 Object Modeling (Ref1 p370-p382)

6. System Design (9hrs.)

Instructional Objectives

- Apply the modeling method to a given scenario in order to produce appropriate diagrams and justify your decisions.
- Identify and Differentiate between different System Design approaches.
- Describe the design phase tasks in terms of a computer based solution for a given system development project.
- Differentiate between logical and physical data flow diagrams.

Material /Sub Topics

6.1 Introduction to system design (Ref1 p446- p453)
6.2 System Design Approaches (Ref1 p446- p453)
- 6.2.1 Modern Structured Design - Structure Charts
- 6.2.2 Information engineering
- 6.2.3 Prototyping
- 6.2.4 Joint Application Development (JAD)
- 6.2.5 Rapid Application Development (RAD)
- 6.2.6 Object Oriented Design

6.3 Application Architecture and Modeling (Ref1 p476-p502)
6.3.1 Physical Data Flow Diagrams
6.3.2 Information Technology Architecture

7 Project Management (2hrs) (Ref1 p119 - 129)

Instructional Objectives

- Describe the causes for failure of a given information system and/or technology projects
- Describe the basic functions of project management
- Differentiate between PERT and Gantt charts as project management tools
- Draw a Gantt chart for a given project schedule

Material /Sub Topics

7.1 What is Project Management? (Ref1 p120- p127)
7.2 Causes of failed projects
7.3 Project manager competencies
7.4 Project management functions
7.5 Project management tools and techniques
7.5.1 PERT charts
7.5.2 Gantt charts
7.6 Project management software

8. Automated Tools and Technology (2hrs.) (Ref1 p107-p111)

- Identify the functionalities of the different types of automated tools available for development of IS
- Explain Computer Aided Systems Engineering (CASE) & CASE tools, and their benefits

Material /Sub Topics

8.1 Computer Assisted Systems Engineering
8.1.1 CASE Repositories
8.1.2 CASE facilities
Diagramming tools, Dictionary tools, Design tools, Quality management tools, Documentation tools, Design and Code generator tools, Testing tools
8.1.3 Forward and Reverse Engineering
8.2 Application Development Environments
8.3 Process and Project Management Tools
8.4 Benefits of using CASE tools in Systems Development (Refer Learning material)

PLATFORM / TUTOTIALS

No Practical required
