

Comments/Suggestions: CPT 125

Pre-Requisite: Completion of 1st Year Courses

Formatted: Superscript

Introduction:

Systems Design is a central part of systems development. It comprises the process of turning a set of user requirements into an implementable system and encompasses various activities to achieve this end. Alternative models are challenging the traditional systems development life cycle. Alongside this, two approaches to systems development are emerging: the traditional structured approach; and the object oriented approach. The systems design activity will be studied in the context of these trends. Students should make themselves familiar with at least one traditional approach (e.g. SSADM) and one object oriented approach (e.g. UML).

Aims:

- To understand the role of systems design within various systems development life cycles
- To develop awareness of the different approaches that may be taken to systems design
- To understand and apply the tools and techniques that are currently used by systems designers

Objectives:

- Describe different life cycle models and explain the contribution of systems design within them
- Discuss various systems development approaches and explain their strengths and weaknesses

- Evaluate the tools and techniques that may be used by a system designer in a given context
- Use appropriate methods to produce a system design for a given scenario
- Provide suitable systems documentation for a design
- Discuss the CASE tools currently available

Content:

Week 1- 3 SYSTEMS DEVELOPMENT LIFE CYCLE MODELS

Traditional Waterfall Model

Alternative Models

Iterative; Spiral;

Rapid Application Development; Prototyping;

Joint Application Design; User Participation

Week 4-5 SYSTEMS DEVELOPMENT APPROACHES

An overview of the following approaches and role of design within them:

Structured Systems Development

Object oriented Analysis and Design

Week 6-8 STRUCTURED SYSTEMS DESIGN (LOGICAL)

Logical Database Design

Entity-Relationship Modelling; Transforming the Entity Models to a Relational Schema;

Normalisation; Denormalisation; Views

Logical Process Design

Context Diagrams; Data Flow Diagrams; State Transition Diagrams; Entity Life

Histories; Decision Tables; Structured English

Week 9-12 OBJECT ORIENTED DESIGN (LOGICAL)

Main Concepts

Objects; Classes; Messages; Methods; Inheritance; Encapsulation;

Static Modelling

← Formatted: Indent: Left: 0.5", First line: 0.5"

← Formatted: Indent: Left: 0.5", First line: 0.5"

← Formatted: Indent: Left: 0.5", First line: 0.5"

← Formatted: Indent: Left: 0.5", First line: 0.5"

Class Hierarchies (generalisation -specialisation relationships);

Containment hierarchies (whole-part relationships)

Dynamic Modelling

Messages: Services; Methods

Week 13-15 PHYSICAL SYSTEMS DESIGN

Database Design

Record structures; File Organisations; Indexes; DBMS Platforms;

Physical Objects

Physical Process Design

Physical DFD; Modules; Structure Chart; Transform analysis; Transaction analysis

Week 13-15 IMPLEMENTATION, EVALUATION & MAINTAINANCE

Introduction to UML & Design Tools

Formatted: Indent: Left: 0.5", First line: 0.5"

Formatted: Indent: Left: 0.5", First line: 0.5"

Formatted: Indent: Left: 0.5", First line: 0.5"

INTRODUCTION TO SYSTEM ANALYSIS AND DESIGN

	Programme: COMPUTER TECHNOLOGY	Course Code: CPT 125	Credit Hours: 4
	Subject/Course: INTRODUCTION TO SYSTEMS ANALYSIS AND DESIGN		Theoretical: 2 hours/week
	Year: One Semester: Two	Pre-requisite: None	Practical: 2 hours /week

General Objectives: On completion of this course the student should be able to:

- 1.0 Understand the system concepts.
- 2.0 Understand the stages of system analysis.
- 3.0 Understand the process of feasibility study
- 4.0 Know the basic guide lines for writing a feasibility study report.
- 5.0 Understand systems implementation process.
- 6.0 Understand Systems Design.
- 7.0 Understand Data Base Design.
- 8.0 Understand input Design and output design.
- 9.0 Understand system implementation
- 10.0 Understand systems evaluation process.
- 11.0 Understand systems maintenance process.
- 12.0 Understand UML

	Course: INTRODUCTION TO SYSTEM ANALYSIS AND DESIGN		Course Code: COM-125_CPT 125		Credit Hours: 45	
					Theoretical: 2 hours/week	
	Year: Two	Semester: One	Pre-requisite:		None	Practical: 1 hours /week
			Theoretical Content		Practical Content	
General Objective 1: 0 Understand the system concepts.						
Wee k/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
General Objective3: General systems theory and its application						
1.	<p>To understand:</p> <p>The definition of a system and its basic features.</p> <p>To Recognize manual and automated systems.</p> <p>To distinguish between manual and automated systems.</p>	<p>Explain the following:</p> <p>Input, process output, abstract / physical systems</p> <p>A general model of a physical system- input, process, output Environment, Decomposition subsystem and Simplification, Coupling and decoupling, System Feedback, Deterministic /Probabilistic, closed system/open system, Efficiency and Effectiveness</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>Ability to:</p> <p>Recognize basic features of a system.</p> <p>To note differences between manual and automated system.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any appropriate system analysis package.</p>
General Objective 2: Know the stages of system analysis						
2	<p>To understand:</p> <p>Systems analysis and logical stages of systems development.</p> <p>The systems development process, planning, control and</p>	<p>To explain:</p> <p>The logical stages of systems</p> <p>The development, initiation and preliminary survey, feasibility.</p> <p>The Study, investigation, analysis, design, programming, implementation, evaluation and</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>Ability to:</p> <p>Analyze a system.</p> <p>Plan , coordinate and develop a</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p>

	coordination	maintenance. To explain: The system development process, planning, control and coordination.		system.		Or any other appropriate system analysis package.
Week/s	General Objective 3: Understand the process of feasibility study.					
Week/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
3	To understand: Feasibility study, its objectives, and major factors.	<ul style="list-style-type: none"> • Explain feasibility study • Explain the major factors to be considered in feasibility study • Determine the objectives of the user of a feasibility study. 	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes.	Ability to: Set objectives and consider major factors of a system.	To assist students in their practical work.	. Networked PC lab Internet connection SSADM package, Or any appropriate system analysis package.
Week/s	General Objective 4: Know the basic guide lines for writing a feasibility study report					
4	To understand: Features of feasibility study report. Concept of Data flow diagram. Analysis specification.	To describe: The main features of a feasibility study report. To explain: The concept of Data flow Diagram (DFD) techniques To write: analysis specification	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes.	Ability to: Perform feasibility studies Provide data flow diagram Provide system specifications.	To assist students in their practical work.	Networked PC lab Internet connection SSADM package, Or any

						appropriate system analysis package.
Week/s	General Objective 5: 0 Understand systems implementation process					
Week/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
5	<p>To understand:</p> <ul style="list-style-type: none"> Fact finding techniques Ideal system selection Resources requirements of a system 	<p>To explain:</p> <p>Fact finding techniques.</p> <p>To select a system for development.</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>Ability to:</p> <p>Do fact finding for a system.</p> <p>Select an ideal system for a given set of requirements.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any appropriate system analysis package.</p>
Week/s	General Objective 5: Understand systems Design					
6	<p>To understand:</p> <ul style="list-style-type: none"> • System design • System specification • Program specification • System documentation 	<p>To explain:</p> <p>systems design</p> <p>system specification</p> <p>To List the tools used for systems specification</p> <p>To Explain program specification.</p> <p>To list the tools used for program specification.</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>Ability to:</p> <p>Design a system according to a set system specification and to provide documentation for it.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any other appropriate system analysis package.</p>

		To explain: Systems documentation (input, output, processing, access mode, etc) and standard.				
Week/s	General Objective : 6 Understand Data Base Design					
Wee k/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
7	To understand: Database design The similarities and differences between conventional and database files The design of the structures of a database file	To explain: Data Base concept. The similarities and differences between conventional files and data base files. The goals and pre-requisites for a Data Base design To show: The design and structure of a simple Data Base file.	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes.	Ability to: Design a data base. To distinguish between different data base files. To design a structured data base file.	To assist students in their practical work.	Networked PC lab Internet connection SSADM package, Or any other appropriate system analysis package.
Week/s	General Objective 7: Understand Input and Output design					
8	To understand: <ul style="list-style-type: none"> • Input to a system • Methods used for data capture • 	To explain: The input to a system The methods used for data capture and input The current trend in automatic Data collection technology. The Prototyping and design of computer inputs	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes. Samples OMR/OCR forms, smart cards, magnetic, tapes,	Ability to: Implement data capture in a system.	To assist students in their practical work.	Networked PC lab Internet connection SSADM package, Or any appropriate system analysis

			diskettes, and ruled papers.			package.
8	<p>To understand:</p> <p>Current trends in automatic data collection technology.</p> <p>The concept of prototyping and design of computer inputs</p>	<p>To explain:</p> <p>The trends in automatic data collection</p> <p>Prototyping concept and its implementation.</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>To implement:</p> <p>Automatic data capture.</p> <p>Ability to prototype a system.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any appropriate system analysis package.</p>
10	<p>To understand:</p> <p>The principles and guidelines</p> <p>The different types of outputs.</p>	<p>To explain:</p> <p>The principles and guidelines for output design.</p> <p>To describe:</p> <p>The different types of output</p> <p>The output media and formats</p> <p>The prototyping and design of computer output</p>	<p>P.C. with different output devices, such as printers, plotters, and CRT display terminals</p>	<p>Ability to:</p> <p>Handle data outputs and understand its significance.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any other appropriate system analysis package.</p>
11	<p>To understand:</p> <p>The output media and formats.</p> <p>The concept of prototyping and design of computer output.</p>	<p>To explain:</p> <p>Different output formats</p> <p>The process of system prototyping.</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p>	<p>Ability to:</p> <p>Prototype system output.</p> <p>Implement different output</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM</p>

			Online lecture notes.	design for different media.		package, Or any other appropriate system analysis package
Week/s	General Objective 8: Understand System implementation					
Wee k/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
12	To understand; System implementation	To explain: systems implementation How to generate test data To explain: The need for data bank program installation system software installation.	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes.	Ability to: Implement a system based on a set of specifications.	To assist students in their practical work.	Networked PC lab Internet connection SSADM package, Or any appropriate system analysis package.
12	To understand: The process of hardware and software installation. The methods used in system testing	To explain: System installation both hardware and software. How to test a system and perform fault diagnosis.	Pc connected to an OHP Power Point Presentation of lecture notes. Online lecture notes.	Ability to: Perform hardware and software system installation. Perform testing.	To assist students in their practical work.	Networked PC lab Internet connection SSADM package, Or any appropriate system

						analysis package.
Week/s	General Objective 9: Understand Systems evaluation process					
Wee k/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
13	<p>To understand:</p> <p>The methods used in system evaluating, amendments and cost analysis.</p>	<p>To Define:</p> <p>system evaluation</p> <p>To explain:</p> <p>The need for system evaluation</p> <p>The program amendment request.</p> <p>System amendment</p> <p>To design:</p> <p>Amendment request form.</p> <p>To explain:</p> <p>performance variation</p> <p>systems cost components</p> <p>system cost analysis</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p> <p>Online lecture notes.</p>	<p>Ability to:</p> <p>Perform system evaluation and cost analysis.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM package,</p> <p>Or any appropriate system analysis package.</p>
Week/s	General Objective 10: Understand Systems Maintenance process					
14	<p>To understand:</p> <p>The concepts of systems maintenance and standards.</p>	<p>To define systems maintenance</p> <p>To describe:</p> <p>The need for systems maintenance</p> <p>To state:</p>	<p>Pc connected to an OHP</p> <p>Power Point Presentation of lecture notes.</p>	<p>Ability to:</p> <p>Maintain systems and standards.</p>	<p>To assist students in their practical work.</p>	<p>Networked PC lab</p> <p>Internet connection</p> <p>SSADM</p>

		Systems standard To explain: Users role in systems maintenance	Online lecture notes.			package, Or any appropriate system analysis package.
Week/s	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
General Objective 11: Understand Unified Modelling Language UML						
15	Define UML Application of UML Different UML Diagrams: Use case diagrams, Class diagrams, Sequence Diagrams, Collaboration Diagrams etc. Applications:	To Explain: UML Application of UML Different UML Diagrams: Use case diagrams, Class diagrams, Sequence Diagrams, Collaboration Diagrams etc.	Networked PC lab Software Internet connection	Create a UML Model for a simple program	Show different models for specific program	Networked PC lab Software Internet connection

Assessment: Give details of assignments to be used:
Coursework/Assignments 40 %; Course test 10 %; Practical 20 %; Examination 30 %

Recommended Textbooks & References: