Course Title:**System Analysis and Design**
Course No. : ICT Ed. Nature of Course: Theoretical + Practical
Level: B.Ed. Credit Hours: 3 (2T+1P)
Semester: Fourth Teaching Hours: 80 (32T+48P)

1. Course Description

The course is a blend of understanding of system analysis & design with its practical applications. This course includes understanding of various elements of system analysis and design with emphasis on the application of information technology issues as a business tool. The course covers components of system analysis and design techniques, data modeling, logical process modeling, and object oriented modeling techniques.

2. Course Objectives

Following are the general objective of this course:

- To familiarize the students with System Development Life Cycle .
- To enhance the skill of students in System analysis and design of System requirements.
- To make the students competent in analysis, design and implementation.
- To enable the students to construct DFD, ER-D, Use Case, Class Diagram, Forms and Interface.
- To make the students knowledgeable about the latest trends of modern system analysis and design.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Explain system and its major components • Define System Development Lifecycle • Discuss steps in System Development Lifecycle • Demonstrate the various development routes • Describe and use different CASE tools	**Unit I: Information System Development (12 Hrs)** 1.1. Fundamentals of System Analysis and Design: System, Information System, System analysis and design and its importance 1.2. Process of System Development, Capability Maturity Model (CMM) Level 1.3. System Life Cycle Vs. Development, Underlying Principles for System Development, System Development Lifecycle (SDLC): Planning and Selection, Analysis, Design, Implementation and Operation, Cross Life Cycle Activities 1.4. Alternate Approaches to Development: Rapid Application Development, Agile Methodology, Commercial Off The Components (COTS), Maintenance and Reengineering

	1.5. Automated Tools and Technology: CASE Tools, Application Development Environments **Lab Work** • Discuss the use of CASE Tools
• Perform feasibility analysis of system from various dimensions • Discuss about details of cost-benefit analysis	**Unit II: Feasibility Analysis (8 Hrs)** 2.1. Feasibility Analysis: A creeping commitment approach, Four Test of feasibility: Schedule, Technical, Operational, Economic 2.2. Cost-benefit Analysis Techniques: payback analysis, return on investment, break-even analysis, net present value 2.3. Feasibility Analysis of Candidate system: Candidate System Matrix, Feasibility Analysis Matrix
• Describe importance of requirement discovery and analysis • Collect functional non-functional requirements of real world system • Demonstrate various fact finding techniques	**Unit III: Determining System Requirement (12 Hrs)** 3.1. Requirement Discovery, System Requirements: Functional and non-functional requirements 3.2. The Process of Requirement Discovery: Problem Discovery and Analysis, Requirements Discovery, Documenting and Analyzing Requirements, Requirements Management 3.3. Traditional Methods for determining requirements: interview, questionnaire, sampling, survey 3.4. Modern Methods for determining requirements: Joint Application Design, Using Prototypes for Requirement determination, 3.5. Documenting requirements using Use Case List **Lab Work** • Practice use case diagrams by using CASE Tools
• Discuss importance of logical data models • Design ERD for real world applications • Construct entities, relationships and attributes	**Unit IV: Data Modeling (12 Hrs)** 4.1. Data Modelling and Analysis, Introduction to Entity Relationship Modelling, Conceptual Data Modelling using Entity Relationship Diagram (ERD), Crow's-foot Notation of ER Diagram, 4.2. Relationships: Unary, Binary and N-ary, Cardinalities in Relationships, Identifying

• Demonstrate importance of data normalization	Relationship, Non-Identifying Relationship, Associative Entity and Non-specific Relationships, Examples of ERD 4.3. The Process of Logical Data Modelling: Context Data Model, Key-based Data Model, Fully Attributed data model 4.4. Data Analysis: 1NF, 2NF and 3NF, Mapping Data Requirements to Locations **Lab Work** • Draw ER diagrams of real world problems by using CASE Tools
• Discuss process modeling using DFD • Design DFD for real world applications • Decompose DFD at different levels • Describe and demonstrate modeling of process logic	**Unit V: Process Modeling (12 Hrs)** 7.1. Process Modelling, Data Flow Diagram (DFD), System concepts for process modelling, Components of DFD, Data Flow Diagramming Rules, The Process of Logical Process Modelling 7.2. Decomposition of DFD: Context dataflow diagram, Functional Decomposition Diagram, Level-1 DFD, Level-2 DFD, Level-n DFD, Guidelines for Drawing DFD 7.3. Logic Modelling: Structured English & Decision Tables **Lab Work** Draw data flow diagrams of real world problems by using CASE Tools
• Demonstrate steps of construction and implementation of a system • Demonstrate concepts of system maintenance and support	**Unit VI: System Implementation and Operation (12 Hrs)** 6.1 System Construction and Implementation: The Construction Phase, The Implementation Phase, Testing: Unit, System and Regression Testing 6.2 System Operation and Support: Systems Development, Operation, and Support Functions 6.3 Program/ System Maintenance, System recovery, System Enhancement

	Lab Work • Demonstrate unit and integration testing.
• Discuss Object Oriented Approach for building system • Design different UML diagrams for real world applications • Demonstrate Object Oriented Analysis and Design	**UNIT VII : Object-Oriented Analysis and Design (12)** 7.1 Object Oriented Development Life Cycle, Unified Modelling Language 7.2 UML Diagrams: Use-Case Diagram, Class Diagram, Object Diagram, Interaction Diagrams: Sequence and Collaboration Diagram, State Diagram, Activity Diagram, Component Diagram, Deployment Diagram 7.3 Object Oriented Analysis: Requirement Analysis using Use Case Model, Conceptual Modeling 7.4 Object Oriented Design: Defining Interaction Diagrams, Defining Design Class Diagrams **Lab Work** • Draw UML diagram by using CASE Tools.

4. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Instructional Techniques

Reading materials will be provided to students in each unit. Lecture preferably with the use of multi-media projector, demonstration, practical classes, discussion, and brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching-learning process. Specifically, demonstration with practical works will be specific instructional technique in this course.

5. Evaluation :

Internal Assessment	External Practical Exam/Viva	Semester Examination	Total Marks
40 Points	20 Points	40 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

5.1 Internal Evaluation (40 Points):

Internal evaluation will be conducted by subject teacher based on following criteria:

1) Class Attendance 5 points
2) Learning activities and class performance 5 points
3) First assignment (written assignment) 10 points
4) Second assignment (Case Study/project work with presentation) 10 points
5) Terminal Examination 10 Points

Total 40 points

5.2 Semester Examination (40 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

1) Objective question (Multiple choice 10 questions x 1mark) 10 Points
2) Subjective answer questions (6 questions x 5 marks) 30 Points

Total 40 points

5.3 External Practical Exam/Viva (20 Points):

Examination Division, Dean Office will conduct final practical examination at the end of semester.

5.4 Practical Exam/Viva (20 Points)

Internal assessment (Record Book-4 points, Project work Presentation- 2, Internal Practical Test-2 Points)	Semester final examination	Total
8 Points	12 Points	20 Points

6. Recommended Books and References materials (including relevant published articles in national and international journals)

Prescribed Texts

1. Jeffrey L. Whitten, Lonnie Bentley, **System Analysis and Design methods,** 7th Edition, Mc-Graw Hill
2. Joseph S. Valacich, Joey F. George, Jefferey A. Hoffer, **Essentials of System Analysis and Design**, 5th Edition, Pearson Education.

References

1. Jefferey A. Hoffer, Joey F. George, Joseph S. Valacich, **Modern Systems Analysis and Design**, 7th Edition, Pearson Education
2. Gary B. Shelly, Harry J. Rosenblatt, **System Analysis and Design**, 9th Edition, Shelly Cashman Series
3. Alan Dennis, Barbara Haley Wixom, Roberta M. Roth **System Analysis and Design**, 4th Edition, Wiley Publication
4. V. Rajaraman, **Analysis and Design of Information System**, 2nd Edition, Prentice Hall