System Analysis and Design

Course Title: System Analysis and Design
Course No: CSC315
Nature of the Course: Theory + Lab
Semester: V

Full Marks: 60 + 20 + 20
Pass Marks: 24 + 8 + 8
Credit Hrs: 3

Course Description: This course familiarizes students with the concepts of information systems development including systems development life cycle, different approaches to systems development, project management, planning, analysis, design, implementation and maintenance. This course also covers some fundamental concepts of object oriented systems analysis and design.

Course Objectives: The main objective of this course is to provide knowledge of different concepts of system analysis and design so that students will be able to develop information systems using different methodologies, tools, techniques, and approaches.

Detail Syllabus:

Unit 1	**Foundations for Systems Development**	**Teaching Hours (10)**
Unit 1.1 The Systems Development Environment	Introduction (***Information System and its Types, System Analysis and Design***) ; A Modern Approach to Systems Analysis and Design; Developing Information Systems and the Systems Development Life Cycle; The Heart of the Systems Development Process and Traditional Waterfall SDLC; CASE Tools	3 Hrs.
Unit 1.2 Other Approaches	Prototyping; Spiral; Rapid Application Development; Introduction to Agile Development	3 Hrs.
Unit 1.3 Managing the Information Systems Project	Introduction; Managing the Information Systems Project (***Project Management and it's Phases***); Representing and Scheduling Project Plans (***Gantt Charts, Network Diagrams, Representing Project Plans, Calculating Expected Time Duration using PERT***); Using Project Management Software	4 Hrs.
Unit 2	**Planning**	**Teaching Hours (5)**
Unit 2.1 Identifying and Selecting Systems Development Projects	Introduction; Identifying and Selecting Systems Development Projects (***The Process of Identifying and Selecting IS Development Projects, Deliverables and Outcomes***); Corporate and Information Systems Planning	2 Hrs.
Unit 2.2 Initiating and Planning Systems Development Projects	Introduction; Initiating and Planning Systems Development Projects (***Process of Initiating and Planning IS Development Projects, Deliverables and Outcomes***), Assessing Project Feasibility (***Accessing Economic, Technical, Operational, Scheduling, Legal and contractual, and Political Feasibility***); ***Commonly used Cost-Benefit***	3 Hrs.

	Analysis Techniques (Net Present Value, Return on Investment, Break-Even Analysis); Building and Reviewing the Baseline Project Plan	
Unit 3	**Analysis**	**Teaching Hours (13)**
Unit 3.1 Determining System Requirements	Introduction; Performing Requirements Determination (***Process and Deliverables***); Traditional Methods for Determining Requirements (***Interviewing and Listening, Interviewing Groups, Directly Observing Users, Analyzing Procedures and other Documents***); Contemporary Methods for Determining System Requirements (***Joint Application Design, Prototyping***); Radical Methods for Determining System Requirements (***Business Process Reengineering, Identifying Process to Reengineer, Disruptive Technology***)	3 Hrs.
Unit 3.2 Structuring System Process Requirements	Introduction; Process Modeling (***Modeling a System's Process for Structured Analysis, Deliverables and Outcomes***); Data Flow Diagrams (***Context Diagram and DFD, Data Flow Diagramming Rules***, ***Decomposition and Balancing DFDs***); Modeling Logic with Decision Tables, Decision Trees, and Pseudocodes	6 Hrs.
Unit 3.3 Structuring System Data Requirements	Introduction; Conceptual Data Modeling (***Process, Deliverables and Outcomes***); Gathering Information for Conceptual Data Modeling; Introduction to E-R Modeling (***Entities, Attributes, Keys and Identifiers,*** **Relationships: Degree, Cardinality, Naming and Defining Relatioships, Associative Entity**)	4 Hrs.
Unit 4	**Design**	**Teaching Hours (7)**
Unit 4.1 Designing Databases	Introduction; Database Design (***Process, Deliverables and Outcomes, Relational Database Model, Well-structured Relations***); Normalization (***Normalization up to 3NF***); Transforming E-R Diagrams Into Relations; Merging Relations; Physical File and Database Design; Designing Fields; Designing Physical Tables	3 Hrs.
Unit 4.2 Designing Forms and Reports	Introduction; Designing Forms and Reports (***Process, Deliverables and Outcomes***); Formatting Forms and Reports (***General Formatting Guidelines, Highlighting Information, Color vs. No-Color, Displaying Text, Designing Tables and Lists, Paper vs. Electronic Reports***); Assessing Usability (***Usability Success Factors, Measures of Usability***)	2 Hrs.
Unit 4.3 Designing Interfaces and Dialogues	Introduction; Designing Interfaces and Dialogues (***Process, Deliverables and Outcomes***); Interaction Methods and Devices (***Methods of Interacting,***	2 Hrs.

	Hardware Options for System Interaction); Designing Interfaces (***Designing Layouts, Structuring Data Entry, Controlling Data Input, Providing Feedback, Providing Help***); Designing Dialogues; Designing Interfaces and Dialogues in Graphical Environments	
Unit 5	**Implementation and Maintenance**	**Teaching Hours (4)**
Unit 5.1 System Implementation	Introduction, System Implementation (***Coding, Testing and Installation Process, Deliverables and Outcomes from Coding, Testing, Installation, Documenting, and Training and Supporting Users***), Software Application Testing (***Different Types of Testing, the Testing Process***), Installation (***Installation and its Types***), Documenting the System, Training and Supporting Users, Organizational Issues in Systems Implementation	2 Hrs.
Unit 5.2 Maintaining Information Systems	Introduction, Maintaining Information Systems(***Process, Deliverables and Outcomes***), Conducting Systems Maintenance (***Types and Cost of Maintenance, Managing Maintenance, Using Automated Tools***)	2 Hrs.
Unit 6	**Introduction to Object-Oriented Development**	**Teaching Hours (6)**
Introduction to Object-Oriented Development	Basic Characteristics of Object-Oriented Systems; Object-Oriented System Analysis and Design (OOSAD); Introduction to Unified Modeling Language, Structural (***Class, Object, Deployment, and Component Diagram***) and Behavioral (***Use Case, Activity, Sequence, and State***) Diagrams	6 Hrs.

Laboratory / Project Work: In the practical session, students will learn to use project management, CASE, and modeling tools. They also prepare a project report that includes at least analysis, design, and implementation phases of system analysis and design. The project can be done in groups with at most four members in each group using any suitable database, programming, and interfacing technologies.

Text Books:

1. Joseph S. Valacich and Joey F. George, *Modern Systems Analysis and Design*, 8th Edition, Pearson
2. Alan Dennis, Barbara Haley Wixom, and David Tegarden, Systems Analysis and Design – An Object-Oriented Approach with UML, 5th Edition, Wiley

References Books:

1. Kenneth E. Kendall and Julie E. Kendall, System Analysis and Design, 9th Edition, Pearson
2. Jeffrey Whitten and Lonnie Bently, System Analysis and Design Methods, 7th Edition Scott Tilley and Harry J. Rosenblatt, System Analysis and Design, 11th Edition

Model Questions

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Course No: CSC315
Semester: V

Full Marks: 60
Pass Marks: 24
Credit Hrs: 3

Section A
Attempt any two questions. (2 × 10 = 20)

1. Define system development life cycle (SDLC). Explain each phase of SDLC in detail. (2 + 8)
2. Assuming monetary benefits of an information system at $85,000 per year, one-time costs of $75,000, recurring costs of $35,000 per year, a discount rate of 12 percent, and a five-year time horizon, calculate the net present value of these costs and benefits of an information system. Also calculate the overall return on investment of the project and then present a break-even analysis. At what point does breakeven occur? (10)
3. What is process modeling? Draw context diagram and DFD for a burger restaurant in Kathmandu city where many people frequently order burger at the restaurant. The restaurant uses an information system that takes customer orders, sends the orders to the kitchen, monitors goods sold and inventory, and generates reports for management. (2 + 8)

Section B
Attempt any eight questions. (8 × 5 = 40)

4. What is CASE tool? Explain different components of CASE tool. (1 + 4)
5. Define software project management. Explain each phase of software project management in brief. (1 + 4)
6. Explain the process of identifying and selecting information system development project in brief. (5)
7. Explain JAD method for determining requirements? What are the benefits of using JAD? (3 + 2)
8. What is data modeling? How is it different from process modeling? How do you use entity relationship model for data modeling? (1 + 2 + 2)
9. How do you format forms and reports? Explain general guidelines for formatting forms and reports? (2 + 3)
10. What is installation? What are the different approaches to installation? (1 + 4)
11. What is class diagram? Explain class diagram with suitable example. (2 + 3)
12. Write short notes on: (2 × 2.5 = 5)
    a. Agile development
    b. Maintenance cost