

SYSTEM ANALYSIS AND DESIGN**Module 1: Data and Information (3)**

Types of information: operational, tactical, strategic and statutory – why do we need information systems – management structure – requirements of information at different levels of management – functional allocation of management – requirements of information for various functions – qualities of information – small case study.

Module 2: Systems Analysis and Design Life Cycle (3)

Requirements determination – requirements specifications – feasibility analysis – final specifications – hardware and software study – system design – system implementation – system evaluation – system modification. Role of systems analyst – attributes of a systems analyst – tools used in system analysis

Module 3: Information gathering (3)

Strategies – methods – case study – documenting study – system requirements specification – from narratives of requirements to classification of requirements as strategic, tactical, operational and statutory. Example case study

Module 4: Feasibility analysis (3)

Deciding project goals – examining alternative solutions – cost – benefit analysis – quantifications of costs and benefits – payback period – system proposal preparation for managements – parts and documentation of a proposal – tools for prototype creation

Module 5: Tools for systems analysts (3)

Data flow diagrams – case study for use of DFD, good conventions – leveling of DFDs – leveling rules – logical and physical DFDs – software tools to create DFDs

Module 6: Structured systems analysis and design (3)

Procedure specifications in structured English – examples and cases – decision tables for complex logical specifications – specification oriented design vs procedure oriented design

Module 7: Data oriented systems design (3)

Entity relationship model – E-R diagrams – relationships cardinality and participation – normalizing relations – various normal forms and their need – some examples of relational data base design.

Module 8: Data input methods (3)

Coding techniques – requirements of coding schemes – error detection of codes – validating input data – input data controls interactive data input

Module 9: Designing outputs (2)

Output devices – designing output reports – screen design – graphical user interfaces – interactive I/O on terminals.

Module 10: Object oriented systems modeling (4)

What are objects? – Why objects? – Objects and their properties – classes – inheritance – polymorphism – how to identify objects in an application – how to model systems using objects – some cases of object oriented system modeling

Module 11: Control – audit and security of information systems (4)

Audit and security of information systems – why controls are needed – objectives of control – techniques used in control – auditing information systems – auditing around, through and with the computer – testing information systems – types of tests – how to generate tests – security of information systems – disaster recovery – business process continuity

Module 12: Systems analysis and design in the era of electronic commerce (3)

B2B, B2C and C2C e-commerce – advantages and disadvantages of e-commerce. E-commerce system architecture – physical networks, logical network, World Wide Web, web-services – html, XML.

Module 13: Electronic data interchange (2)

EDI standards – virtual private networks – XML and EDI.

Module 14: Security of e-commerce transactions, firewalls (3)

Encryption methods – symmetric and asymmetric encryption – digital signature – certifying authorities for signatures – legal status of e-commerce transactions

Module 15: Payment systems in e-commerce (2)

Cheque payment, credit card payments, e-cash payments.

Module 16: Complete system analysis and design case studies (5)

A system for journal acquisition in libraries – walk through the entire life cycle

Lecture Plan

Modules	Learning Units	Hours per topic	Total Hours
1. Data and Information	1. Types of information: operational, tactical, strategic and statutory	0.5	3
	2. Why do we need information systems, management structure, requirements of information at different levels of management	1	
	3. Functional allocation of management, requirements of information for various functions	1	
	4. Qualities of information– small case study	0.5	
2. Systems Analysis and Design Life Cycle	5. Systems Analysis and Design life Cycle: Requirements determination, requirements specifications	1	3
	6. Feasibility analysis, final specifications, hardware and software study, system design, system implementation, system evaluation, system modification.	1	
	7. Role of systems analyst – attributes of a systems analyst – tools used in system analysis	1	
3. Information gathering	8. Information gathering, strategies, methods	1	3
	9. Case study/documenting study, system requirements specification, from narratives of requirements to classification of requirements as strategic, tactical, operational and statutory. Example case study	2	
4. Feasibility analysis	10. How to formulate project goals and quantify them	1	3
	11. Examining alternative solutions and evaluating proposed solutions a) Technical feasibility b) Operational feasibility c) Economic feasibility	1	
	12. Cost benefit analysis, Documenting feasibility report	1	
5. Tools for systems analysts	13. Developing Data Flow Diagrams (DFD) a) What are DFDs? b) Symbols used in DFD c) Rules of data flow d) Good style in drawing DFD	1.5	3
	14. Describing systems with DFD & Leveling DFD	1	
	15. Logical & Physical DFDs	0.5	

6. Structured systems analysis and design	16. Structured English specification	1	4.5
	17. Decision table based specification	1	
	18. Detecting 19. Incompleteness 20. Ambiguity 21. Contradictions 22. Redundancy 23. in decision table specification	1	
	24. Eliminating redundancy in specifications	1	
	25. Decision trees for specification	0.5	
7. Data oriented systems design	26. Entity-relationship (E-R) modeling 27. of data elements of an application	1	5
	28. Organization of data as relations	0.5	
	29. Normalization of relations	1	
	30. Creation of logical relational database	1	
	31. Objectives of database management system (DBMS)	1	
	32. Overview of DBMS	0.5	
8. Data input methods	33. Data input methods, coding techniques, requirements of coding schemes	1	3
	34. Error detection of codes, validating input data	1	
	35. Input data controls interactive data input	1	
9. Designing outputs	36. Designing outputs, output devices, designing output reports	1	2
	37. Screen design, graphical user interfaces, Interactive I/O on terminals.	1	
10. Object oriented systems modeling	38. Object oriented systems modeling	0.5	4
	39. What are objects? Why objects?	0.5	
	40. Objects and their properties, classes, inheritance, polymorphism	1	
	41. How to identify objects in an application, how to model systems using objects	1	
	42. Some cases of object oriented system modeling	1	
11. Control-audit and security of information systems	43. Control, audit and security of information system	0.5	4
	44. Why controls are needed, objectives of control, techniques used in control	0.5	
	45. Auditing information systems, auditing around, through and with the computer	1	
	46. Testing information systems, types of tests, how to generate tests	1	

	47. Security of information systems, disaster recovery, business process continuity	1	
12. Systems analysis and design in the era of electronic commerce	48. Systems analysis and design in the era of electronic commerce	0.5	4
	49. B2B, B2C and C2C e-commerce, advantages and disadvantages of e-commerce.	0.5	
	50. E-commerce system architecture	1	
	51. Physical networks, logical network, world wide web, web-services – html, XML	2	
13. Electronic data interchange	52. Electronic data interchange, EDI standards	1	2
	53. Virtual private networks – XML and EDI.	1	
14. Security of e-commerce transactions, firewalls	54. Security of e-commerce transactions, firewalls, encryption methods, symmetric and asymmetric encryption,	1.5	3
	55. Digital signature, certifying authorities for signatures, legal status of e-commerce transactions	1.5	
15. Payment systems in e-commerce	56. Payment systems in e-commerce, cheque payment, credit card payments, e-cash payments.	2	2
16. Complete system analysis and design case studies	57. Complete system analysis and design case studies, a system for journal acquisition in libraries, walk through the entire life cycle	5	5