



Indraprastha College for Women

University of Delhi

Course Name:	B. Sc. (Hons.) Computer Science
Paper Title:	Software Engineering
Unique Paper Code:	2342013503
Semester:	V
Faculty(s):	Vimala Kumari
Year:	2026

Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Introduction to Software engineering and process models.	1	Introduction Software Engineering - A Layered Approach (1.2 Ref 1)
		2	Software Process – Process Framework (1.3 Ref 1)
		3	Umbrella Activities (1.3.2 Ref 1)
		4	Process Models – Waterfall Model (2.5.1 Ref 1)
		5	Evolutionary process Model: Prototyping (2.5.2 Ref 1)
		6	Spiral Model (2.5.3 Ref 1)
		7	Incremental Model (2.3.1 Ref 3)
		8	Introduction to Agile – Agility Principles (3.1 Ref 1)
		9	Agile Model – Scrum. (3.4 Ref 1)
II	Creation of SRS, DFD, USE Case etc.	10	Software Requirements Analysis and Specifications (3.4.1 Ref 3)
		11	Use Case Approach (3.4.2 Ref 3)
		12	Software Requirement Specification Document (3.1 Ref 3)
		13	Flow oriented Model, (3.2.2 Ref 3)
		14	Data Flow Model (3.3.1, 3.3.2 Ref 3)
III	Different types of software testing	15	Software Testing: Strategic Approach to Software Testing (8.1 Ref 2)
		16	Some Terminologies (8.2.1 & 8.2.2 Ref 3)
		17	Verification & Validation, Alpha, Beta and Acceptance Testing (8.2.3 & 8.2.4 Ref 3)
		18	Functional Testing (8.3 Ref 3)
		19	Boundary Value Analysis (8.3.1 Ref 2)
		20	Equivalence Class Testing (8.3.2 Ref 2)

		21	Structural Testing, Path Testing (8.4, 8.4.1 Ref 2)
		22	Cyclomatic Complexity (8.4.2 Ref 2)
		23	Level of Testing, Unit Testing (8.5, 8.5.1 Ref 2)
		24	Integration Testing (8.5.2 Ref 2)
		25	System Testing (8.5.3 Ref 2)
		26	Validation Testing (8.6 Ref 2)
IV	Concepts of Design modelling	27	Design Modelling: conceptual & Technical Designs, Objectives of Design (5.1 Ref 2)
		28	Why Design is important, Modularity (5.1.3 & 5.2 Ref 2)
		29	Module Coupling (5.2.1 Ref2)
		30	Module Cohesion (5.2.2 Ref2)
		31	Strategy of Design (5.3 Ref 2)
		32	Function Oriented Design (5.4 Ref 2)
V	Different types of software metrics and project estimations.	33	Software Metrics and Project Estimations Measures, Metrics & indicators (23.1.1 Ref 1)
		34	Metrics for Software Quality (23.8 Ref 1)
		35	Software Project Estimation, (25.6.1Ref 1)
		36	Function based Metrics (25.6.2 Ref 1)
		37	Project Scheduling: Timeline charts (25.10 Ref 1)
		38	Tracking the schedule (25.10 Ref 1)
VI	Quality Control and Risk Management	39	Quality Control and Risk Management Quality Control and Quality Assurance (15.4, 17.2 Ref 1)
		40	Software Risks, Risk Identification (26.1, 26.2 Ref 1)
		41	Risk Projection and Risk Refinement (26.3.1, 26.4.1 Ref 1)
		42	Risk Mitigation, Monitoring and Management (26.6 Ref 1)
		43	Software Process Assessment and Improvement Capability Maturity Model Integration (CMMI) (28.3 Ref 1)
		44	Revision

Unit	TOPICS
I	Introduction: Software Engineering - A Layered Approach; Software Process – Process Framework, Umbrella Activities; Process Models – Waterfall Model, Incremental Model, and Evolutionary process Model (Prototyping, Spiral Model); Introduction to Agile, Agile Model – Scrum.
II	Software Requirements Analysis and Specification: Use Case Approach, Software Requirement Specification Document, Flow-oriented Model, Data Flow Model

III	Design Modeling: Translating the Requirements model into the Design Model, The Design Process, Design Concepts - Abstraction, Modularity and Functional Independence; Structure Charts.
IV	Software Metrics and Project Estimation: Function based Metrics, Software Measurement, Metrics for Software Quality; Software Project Estimation (FP based estimations); Project Scheduling (Timeline charts, tracking the schedule).
V	Quality Control and Risk Management: Quality Control and Quality Assurance, Software Process Assessment and Improvement; Software Risks, Risk Identification, Risk Projection, Risk Mitigation, Monitoring and Management.
VI	Software Testing: Strategic Approach to Software Testing, Unit Testing, Integration Testing, Validation Testing, System Testing; Black-Box and White Box Testing, Basis Path Testing.
S. No.	Name of Authors/Books/Publishers
1.	Pressman, R.S. Software Engineering: A Practitioner's Approach, 9th edition, McGraw-Hill, 2020.
2.	Aggarwal, K.K., Singh, Y. Software Engineering, 3rd edition, New Age International Publishers, 2007.
3.	Jalote, P. An Integrated Approach to Software Engineering, 3rd Edition, Narosa

	Paper Components		
Credits	Lecture (L)	Tutorial (T)	Practical (P)
6	4	0	2
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment - Assignment/Quiz/Project/Presentation - Class Test - Attendance		30
		12	
		12	
		6	
2.	Practical - Continuous Assessment - End Term Written/Practical Exam		50
		20	
		20	

	• Viva	10	
3.	End Semester Examination		90