

LESSON PLAN (2024-25)

# **SOFTWARE ENGINEERING**

**SEMESTER V**

**COMPUTER SCIENCE ENGINEERING**

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**LECTURER (COMPUTER SCIENCE)**

# PLAN: SOFTWARE ENGINEERING

## Semester V

res: 45 | Duration: 15 Weeks (3 Lectures/Week)

Topic	Planned Lecture(s)
Unit 1	
Introduction to Software Engineering: Definition, Need, Goals	1
Software Engineering Layered Approach - Quality, Process, Methods, Tools	1
Software Process Framework - Communication, Planning, Modeling, Construction, Deployment	1
Umbrella Activities - Project Tracking, Risk Management, SQA, Configuration Management	1
Capability Maturity Model Integration (CMMI): Levels 1-5, Key Characteristics	1
Process Assessment and Improvement Models (ISO, SPICE)	1
Software Development Life Cycle: Waterfall Model - Concept, Advantages, Limitations	1
Prototyping Model - Concept, Types, When to use	1
Spiral Model - Risk-driven approach, Quadrants, Applications	1
Agile Model - Agile Manifesto, Scrum, XP, Comparison with Traditional Models	1
Total classes	10
Unit 2	
Core Principles of Software Engineering - Hooker's 7 Principles	1

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Communication Practices: Elicitation Techniques (Interviews, Workshops, Observation)	1
Planning Practices: Scope Definition, Feasibility Analysis	1
Requirement Analysis: Functional vs Non-functional Requirements	1
Requirement Elicitation - Techniques and Challenges	1
Requirement Specification - IEEE 830 Standard, SRS Document Structure	1
Analysis Modeling: Data Modeling - Entity Relationship Diagrams	1
Flow-Oriented Modeling - Data Flow Diagrams (DFD) Levels 0,1,2	1
Class-Based Modeling - UML Class Diagrams	1
Behavioral Modeling - State Transition Diagrams, Sequence Diagrams	1
Total classes	10
<b>Unit 3</b>	
Software Design: Definition, Design within SDLC Context	1
Design Process and Design Quality Attributes	1
Design Concepts: Abstraction, Architecture, Partitioning, Modularity	1
Cohesion - Types from Functional to Coincidental	1
Coupling - Types from Data to Content Coupling	1
Mapping Data Flow into Software Architecture - Transform Mapping	1

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Golden Rules for Interface Design	1
Interface Design Evaluation - Heuristic Evaluation, Usability Testing	1
Total classes (8)	
Unit 4	
Software Testing Fundamentals: Principles, Objectives	1
Strategic Approach to Software Testing - V-Model	1
Test Strategies: Unit Testing, Integration Testing (Top-down, Bottom-up)	1
Validation Testing: Alpha, Beta, User Acceptance Testing	1
System Testing: Recovery, Security, Stress, Performance Testing	1
Black Box Testing - Equivalence Partitioning, Boundary Value Analysis	1
White Box Testing - Statement, Branch, Path Coverage	1
Control Structure Testing, Cyclomatic Complexity - Calculation and Interpretation	1
Debugging: Process, Strategies (Brute Force, Backtracking, Cause Elimination)	1
Total classes (9)	
Unit 5	
The Management Spectrum - 4P's: People, Product, Process, Project	1
Software Quality Concepts - McCall's Quality Factors	1

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The Product, The Process, The Project - Definitions and Interrelationships	1
W5HH Principle - Seven Questions for Project Planning	1
Metrics in Process and Project Domains - GQM Approach	1
Software Measurement - Direct vs Indirect, Size-Oriented, Function-Oriented	1
Software Scope, Feasibility (Technical, Economic, Operational, Schedule, Legal)	1
Software Project Estimation: LOC, Function Points	1
Decomposition Techniques - Problem-Based Estimation	1
Empirical Estimation Models - COCOMO Basic, Intermediate	1
Software Reliability - MTTF, MTBF, MTTR, Availability	1
Make or Buy Decision - Cost Analysis, Break-Even Point	1
Software Quality Assurance (SQA) - Activities, SQA vs Testing	1
Formal Technical Review (FTR) - Process, Roles, Guidelines	1
Total classes	14
Revision classes	
Unit 1 & 2 Revision + Doubt Clearing	1
Unit 3 & 4 Revision + Doubt Clearing	1
Unit 5 Revision + Doubt Clearing	1

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Mock Test / Previous Year Question Paper Discussion	1
Grand. Total lectures <u>45</u>	

Review