Software Engineering

Unit I: Introduction to Software Engineering

- **Software Engineering Overview**: Evolution, significance, and impact of software engineering on the industry.
- **Software Development Life Cycle (SDLC)**: Overview and comparison of models:
    - Waterfall Model
    - Prototyping Model
    - Evolutionary and Spiral Models
- **Requirement Engineering**:
    - Feasibility Study
    - Functional vs. Non-functional Requirements
    - Requirement Gathering Techniques
    - Requirement Analysis and Specification Documentation

Unit II: Software Design Principles

- **Fundamentals of Software Design**:
    - Key design issues
    - Principles of modularity, cohesion, and coupling
- **Function-Oriented Design**:
    - Data Flow Diagrams (DFD): Concepts and construction
    - Transforming functional designs into system architecture

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Unit III: Object Modelling

- **Unified Process Framework**: Concepts and methodologies.
- **Object-Oriented Modelling Using UML**:
    - Fundamental building blocks of UML
    - Structural Diagrams: Class, Component, and Deployment Diagrams
    - Behavioral Diagrams: Use Case, Sequence, Activity, and State Diagrams

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Unit IV: Software Testing and Quality Assurance

- **Testing Fundamentals**:
    - Black Box Testing Techniques (e.g., Equivalence Partitioning, Boundary Value Analysis)
    - White Box Testing Techniques (e.g., Control Flow, Data Flow, Loop Testing)
- **Testing Levels**: Unit Testing, Integration Testing, System Testing, and Acceptance Testing

- **Verification and Validation (V&V)**:
    - Strategies for Conventional Software
    - Object-Oriented Software Testing Strategies
    - Testing for Web and Mobile Applications
- **Debugging and System Testing Strategies**
- **Security Engineering**: Principles and practices for secure software.
- **Software Reliability**: Metrics for reliability and availability, and their measurement techniques.

Unit V: Software Configuration Management and Maintenance

- **Software Configuration Management (SCM)**:
    - SCM Scenario and Core Elements
    - Configuration Items, Baselines, and Repository Management
    - SCM Processes and Tools
- **Risk Management**: Identification, assessment, and mitigation strategies.
- **Maintenance and Reengineering**:
    - Types of Software Maintenance (Corrective, Adaptive, Perfective, and Preventive)
    - Software Reengineering Process Models