



SPPU B.E./B.Tech IT Sem 5 syllabus

Software Engineering and Project Management

314443 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

CREDITS - 03

UNIT - I INTRODUCTION TO SOFTWARE ENGINEERING 06 HOURS

Nature of Software, Software Process, Software Engineering Practice, Software Myths, Generic Process model, Analysis and comparison of Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Concurrent, Specialized Process Models, Personal and Team Process Models, Introduction to Clean Room Software Engineering.

Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, CMM Models.

UNIT - II REQUIREMENT ANALYSIS 06 HOURS

Requirements Capturing: requirements engineering (elicitation, specification, validation, negotiation, prioritizing requirements (Kano diagram) - real life application case study.

Requirements Analysis: basics, scenario based modeling, UML models: use case diagram and class diagram, data modeling, data and control flow model, behavioral modeling using state diagrams - real life application case study, software Requirement Specification.

UNIT - III PROJECT PLANNING 06 HOURS

Project initiation, Planning Scope Management, Creating the Work Breakdown Structure, Effort estimation and scheduling: Importance of Project Schedules, Estimating Activity Resources, Estimating Activity Durations, Developing the Schedule using Gantt Charts, Adding Milestones to Gantt Charts, Using Tracking Gantt Charts to Compare Planned and Actual Dates, Critical Path Method, Program

Evaluation and Review Technique (PERT) with examples. Planning Cost Management, Estimating Costs, Types of Cost Estimates, Cost Estimation Tools and Techniques, Typical Problems with IT Cost Estimates.

UNIT - IV AGILE DEVELOPMENT PROCESS 06 HOURS

Agile Development: Agile manifesto, agility and cost of change, agility principles, myth of planned development, toolset for the agile process.

Extreme Programming: XP values, process, industrial XP, SCRUM - process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution, daily scrum meeting, maintaining sprint backlog and burn-down chart, sprint review and retrospective.

Agile Practices: test driven development, refactoring, pair programming, continuous integration, exploratory testing versus scripted testing

UNIT - V PROJECT MANAGEMENT 06 Hours

Project monitoring and control: tools for project management, Software tools like Microsoft project management or any other open source tools.

The Importance of Project Quality Management: Planning Quality Management, Performing Quality Assurance, Controlling Quality, Tools and Techniques for Quality Control (statistical control, six sigma) The Importance of Project Risk Management, Planning Risk Management, Common Sources of Risk in IT Projects.

UNIT - VI RECENT TRENDS IN SOFTWARE ENGINEERING AND PROJECT MANAGEMENT 06 Hours

Software configuration management: SCM basics, SCM repository, SCM process, SCM tools such as GitHub,

CASE - taxonomy, tool-kits, workbenches, environments, components of CASE, categories (upper, lower and integrated CASE tools).

Emerging software engineering trends: technology evolution, process trends, collaborative development, test-driven development, global software development challenges

Project Management trends: CRM, ERP: Basic concepts, Advantages and limitations, SAP, Business process reengineering, International Project Management, Case studies.

Text Books

1. Roger S Pressman, Software Engineering: A Practitioner's Approach, Mcgraw-Hill, ISBN: 0073375977, Seventh or Eighth Edition.
2. Joseph Phillips, IT Project Management -On Track From Start to Finish, Tata Mc Graw-Hill, ISBN13: 978-0-07106727-0, ISBN-10: 0-07-106727-2.

Reference Books

1. Pankaj Jalote, Software Engineering: A Precise Approach, Wiley India, ISBN: 9788126523115.
2. Marchewka, Information Technology Project Management, Wiley India, ISBN: 9788126543946.
3. Chris Dawson with Ben Straub, Building Tools with GitHub, O'Reilly, Shroff publishers, ISBN: 978-93-5213-333-8.
4. C. Michael Pilato, Ben Collins-Sussman and Brian Fitzpatrick, Version Control with subversion, O'Reilly, Shroff publishers, ISBN: 978-81-8404-728-8.
5. P.C. Tripathi, P.N. Reddy, Principles of Management, Tata McGrew Hill Education Private Limited, ISBN: 9780071333337, ISBN: 0071333339.

Database Management System

314442 : DATABASE MANAGEMENT SYSTEMS

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UNIT - I INTRODUCTION TO DBMS 08 Hours

Introduction: Database Concepts, Database System Architecture, Data Modeling: Data Models, Basic Concepts, entity, attributes, relationships, constraints, keys.

E-R and EER diagrams: Components of E-R Model, conventions, converting E-R diagram into tables, EER Model components, converting EER diagram into tables, legacy system model.

Relational Model: Basic concepts, Attributes and Domains, Codd's Rules.

Relational Integrity: Domain, Entity, Referential Integrities, Enterprise Constraints, Schema Diagram.

Relational Algebra: Basic Operations, Selection, projection, joining, outer join, union, difference, intersection, Cartesian product, division operations (examples of queries in relational algebraic using symbols).

UNIT - II DATABASE DESIGN AND SQL 08 Hours

Database Design: Functional Dependency, Purpose of Normalization, Data Redundancy and Update Anomalies, Single Valued Normalization: 1NF, 2NF, 3NF, BCNF. Decomposition: lossless join decomposition and dependency preservation, Multi valued Normalization (4NF), Join Dependencies and the Fifth Normal Form. Introduction to SQL: Characteristics and advantages, SQL Data Types and Literals, DDL, DML, DCL, SQL Operators, Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Updating using Views, Indexes, Nulls SQL DML Queries: SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries.

UNIT - III QUERY PROCESSING AND DATABASE TRANSACTIONS 08 Hours

Query Processing: Overview, Measures of query cost, Evaluation of expression, Materialization and Pipelining algorithm. Transaction: Basic concept of a Transaction, Transaction Management, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and No recoverable Schedules. Concept of Stored Procedures, Cursors, Triggers, assertions, roles and privileges Programmatic SQL: Embedded SQL, Dynamic SQL, Advanced SQL-Programming in MYSQL.

UNIT - IV CONCURRENCY CONTROL AND ADVANCED DATABASES 08 Hours

Concurrency Control: Need, Locking Methods, Deadlocks, Time-stamping Methods, and Optimistic Techniques. Recovery Methods: Shadow-Paging and Log-Based Recovery, Checkpoints, Performance Tuning, Query Optimization with respect to SQL Database. Database Architectures: Centralized and Client-Server Architectures, 2 Tier and 3 Tier Architecture, Introduction to Parallel Databases, Key elements of Parallel Database Processing, Architecture of Parallel Databases, Introduction to Distributed Databases, Architecture of Distributed Databases, Distributed Database Design.

UNIT - V LARGE SCALE DATA MANAGEMENT 08 Hours

Emerging Database Technologies: Introduction to No SQL Databases- Internet Databases, Cloud Databases, Mobile Databases, SQLite

Database, XML Databases, MongoDB.

Introduction to Big Data and XML: DTD, XML Schemas, XQuery, XPath.

JSON: Overview, Data Types, Objects, Schema, JSON with Java/PHP/Ruby/Python.

Hadoop: HDFS, Dealing with Massive Datasets-Map Reduce and Hadoop.

Introduction to HBase: Overview, HBase Data Model, HBase Region, Hive.

UNIT - VI DATA WAREHOUSING AND DATA MINING 08 Hours

Data Warehousing: Introduction, Evolution of Data Warehouse, Characteristics, Benefits, Limitation of Data Warehousing, Architecture and Components of Data Warehouse, Conceptual Models, Data Mart, OLAP.

Data Mining: Process, Knowledge Discovery, Goals of Data Mining, Data Mining Tasks, Association, Classification, Clustering, Big Data (Terminology and examples) Introduction to Machine learning for Big Data and Business Intelligence.

Text Books

1. Silberschatz A., Korth H., Sudarshan S, Database System Concepts, McGraw Hill Publication, ISBN- 0-07-120413-X, Sixth Edition.
2. S. K. Singh, Database Systems: Concepts, Design and Application, Pearson Publication, ISBN-978-81-317-6092-5.

Reference Books

1. Thomas H Cormen and Charles E.L Leiserson, Introduction to Algorithm, PHI Publication, ISBN: 81-203-2141-3.
2. R. C. T. Lee, S S Tseng, R C Chang, Y T Tsai, Introduction to Design and Analysis of Algorithms, A Strategic approach, Tata McGraw Hill., ISBN-13: 978-1-25-902582-2. ISBN-10: 1-25-902582-9.
3. Anany Levitin, Introduction to the Design & Analysis of Algorithm, Pearson Publication, ISBN 81-7758-835-4.
4. Steven S Skiena, The Algorithm Design Manual, Springer, ISBN 978-81-8489-865-1, Second Edition
5. George T. Heineman, Gary Pollice, Stanley Selkow, Algorithms in a Nutshell, A Desktop Quick Reference, O'Reilly, ISBN: 9789352133611.
6. Gilles Brassard, Paul Bratle, Fundamentals of Algorithms, Pearson Publication, ISBN 978-81-317-1244-3.

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