

**3/4 B.Tech. SECOND SEMESTER
SOFTWARE ENGINEERING**

CS6T4

Required

Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Course context and Overview: This course is aimed at helping students build up an understanding of how to develop a software system from scratch by guiding them through the development process and giving them the fundamental principles of system development with object oriented technology. The course will initiate students to the different software process models, project management, software requirements engineering process, systems analysis and design as a problem-solving activity, key elements of analysis and design, and the place of the analysis and design phases within the system development life cycle.

Prerequisite: Data structures, Algorithms

Objectives:

1. An understanding of different software processes and how to choose between them
2. How to elicit requirements from a client and specify them
3. Designing the large, including principled choice of software architecture, the use of modules and interfaces to enable separate development, and design patterns.
4. Understanding good coding practices, including documentation, contracts, regression tests and daily builds.
5. Various quality assurance techniques, including unit testing, functional testing, and automated analysis tools.
6. Understanding of software management including planning/scheduling
7. Understanding general case tools

Learning Outcomes:

An ability to:

1. Understand the core principles of software engineering.
2. Apply appropriate software process model for a given scenario.
3. Analyze the requirements for a given problem.
4. Apply the design paradigms to design simple software system.
5. Identify the fundamental principle test-driven development methods.
6. Calculate metrics and interpret the risk strategies to assure the quality of software.

Unit I

Software and Software Engineering:

The Nature of Software, the Unique Nature of Webapps, Software Engineering, the Software Process, Software Engineering Practice, Software Myths

Principles That Guide Practice:

Software Engineering Knowledge, Core Principles

Unit II

Process Models:

Generic Process Model, Prescriptive Process Models, Specialized Process Models, Unified Process, Personal and Team Process Models

Agile Development:

What Is Agility, Agility and Cost of Change, Extreme Programming.

Unit III

Understanding Requirements:

Requirements Engineering, Eliciting Requirements, Developing Use Cases.

Requirements Modeling:

Requirements Analysis, Scenario Based Modeling, Class Based Modeling

Unit IV

Design Concepts:

Design Process, Design Concepts, And The Design Model.

Architectural Design:

Architectural Styles, Architectural Design,

Unit V

Component Level Design:

Designing Class Based Components

User Interface Design:

Golden Rules, User Interface Analysis and Design, Interface Analysis

Pattern-Based Design:

Design Patterns, Architectural Patterns, Component Level Design Patterns, User Interface Design Patterns

Unit VI

Software Testing Strategies:

A Strategic Approach to Software Testing, Test Strategies for Conventional Software, Test Strategies for Object Oriented Software, Validation Testing, System Testing, the Art of Debugging.

Testing Conventional Applications:

White Box Testing, Black-Box Testing.

Unit-VII

Product Metrics:

A Framework for Product Metrics, Metrics for Requirements Model, Metrics for Design Model, Metrics for Testing, Metrics for Maintenance.

Process and Project Metrics:

Metrics in Process and Project Domains, Software Measurement, Metrics for Software Quality

Unit VIII

Risk Management:

Reactive Vs. Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, RMMM, RMMM Plan

Quality Management:

What Is Quality, Software Quality

Software Quality Assurance:

Elements Of Software Quality Assurance, SQA Tasks, Goals And Metrics, The ISO 9000 Quality Standard, SQA Plan.

Learning Resources

Text Book:

1. Software Engineering, 7/E , Roger S. Pressman , TMH

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley
2. Software Engineering Principles and Practice, W S Jawadekar, TMH
3. Software Engineering Concepts, R Fairley, TMH