Title of Course: Software Engineering **Course Code** 18B11CI612
L-T-P Scheme: 3-0-0 **Credits: 3**

Pre-requisite: Good Knowledge of Computer Programming

Post Course:
Object Oriented Software Engineering, Software Quality Management Objective: To engineer good quality software from its specification

Learning Outcomes

Software Engineering	
Course Outcome	**Description**
CO1	Outline various software models with respect to their needs of the customer requirement and concepts of some modeling language.
CO2	Describe the real world problems using software engineering concepts and tools.
CO3	Develop the software design to meet customer expectations using modeling language.
CO4	Identify and use various cost estimation techniques used in software engineering project management.
CO5	Apply verification and validation techniques on a given software project.
CO6	Demonstrate deployment and basic maintenance skills.

Course Outline:
Introduction to software engineering: Software Engineering Principles, Software Development approaches, Generic Process framework, Software process models, PSP, TSP.

Requirement Engineering: Types of Requirements, Requirement Elicitation, Analysis, Specification, SRS, Formal system development techniques, Analysis and Modeling: Data modeling, Functional modeling

UML: Scenario based models. Class based models, Behavioral models, Flow oriented models Use case diagram, Class Diagram, , Collaboration diagram, , State diagram, Sequence diagram Data Flow Diagram.

Software Architecture and Design: Data design, Architectural Design Process, function-oriented design, Object-Oriented Design, Design Patterns: Structural Patterns, Behavioral Patterns, Creational Patterns

Software Estimation- Estimating Size, Effort and Cost: Metric for Analysis, Metric for Design, COCOMO model, Putnam Model etc.,

Implementation and Integration: Coding standard and practices, Top-Down and Bottom–up Approach, Software Testing: Verification and Validation, Structural testing, functional Testing, Testing Strategies, Test Case design.

Software Maintenance: Types, Cost of Software, maintenance, Software Maintenance Models
CASE Tool Taxonomy: Business Process Engineering tool, Process modeling and management tool, project planning tool, requirement tracking tool, Metric and management tool, documentation tool, system software tool etc.

This course should be conducted in a highly interactive environment. Students will work on different software projects in small groups. Exercises shall almost exclusively consist of design work and the laboratory shall be a place to develop these designs using CASE tools. As part of lab work there shall be a project to build a specification and convert it into working software using Rational Unified Process. Also, there shall be a testing project. There is a self learning component that shall be announced.

Evaluation Scheme:

Exams	Marks	Coverage
Test-1	15 Marks	Based on coverage up to Test-1
Test-2	25 Marks	80% based on coverage between Test-1 and Test-2 and 20% from coverage of Test-1
Test-3	35 Marks	60% based on coverage between Test-2 and Test-3 and 40% from coverage up to Test-2
Assignment	10 Marks	
Tutorials	5 Marks	
Quiz	5 Marks	
Attendance	5 Marks	
Total	**100 Marks**	

Text Book

1. Pressman S. Roger, "Software Engineering: A practitioner's Approach", 7th Edition, McGraw Hill.
2. Sommerville, Ian, "Software Engineering", 8th Edition, Pearson Education Ltd.
3. Pankaj Jalote, "An Integrated Approach to Software Engineering" Third Edition , Springer Press
4. Rajiv Mall, " Fundamentals of Software Engineering" Fifth Edition, PHI
5. The Unified Modeling Language Users Guide: Grady Booch, James Rambaugh, Ivar Jacobson, Addision Wesley.
6. Douglas Bell, "Software Engineering for students: a programming approach", 4th Ed Pearson Education.
7. Cooling Jin, "Software Engineering for real time systems, Addison Wesley.
8. Khoshgoftaar, Taghi M. "Software Engineering with Computational Intelligence".

Web References:

1. https://onlinecourses.nptel.ac.in/noc20_cs68/preview
2. https://online.visual-paradigm.com/
3. https://www.coursera.org/learn/introduction-to-software-engineering