

**Subject Code: 01IT0601**

**Subject Name: Software Engineering**

**B.Tech. Year - III**

**Objective:** To understand and apply various software project management techniques based on Software Engineering guidelines and Principles.

**Credits Earned:** 4 Credits

**Course Outcomes:** After completion of this course, student will be able to

- Understand various software engineering principles and their application (Understand)
- Demonstrate use of various Agile methodologies for software development (Apply)
- Apply various modelling techniques for designing system requirement (Apply)
- Identify different types of risk and evaluate its impact on software system (Evaluate)
- Distinguish different testing strategies and Create test cases. (Create)

**Prerequisite:** Object Oriented Programming fundamental.

#### **Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term work (TW)	
3	0	2	4	50	30	20	25	25	150

#### **Contents:**

Unit	Topics	Contact Hours

1	<b>Introduction:</b> Software engineering, Dual role of software, Software Crisis history ,Various Myths Associated with Software, Different Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Component-Based Development, Process, Product and Process.	4
2	<b>Agile Development:</b> SDLC: Agile Method, Manifesto, Various Agile Modeling Techniques, Scrum, Scrum Reference Card, LSS (Large Scale Scrum), XP, ASD, Crystal.	4
3	<b>Project Management Concepts, Requirement Engineering &amp; Metrics:</b> The Management Spectrum,4P's(The People, The Project, The Product), The W5HH Principle. Basic concept of Requirement (Functional & Non Functional), Requirement Modeling and Analysis. Software Process and Project Metrics, Measures, Metrics, and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality.	5
4	<b>Project Planning Scheduling &amp; Tracking:</b> Software Scope, Feasibility Analysis, Empirical Estimation Models, Defining a Task Set for the Software Project, Defining a Task Network, Scheduling	3
5	<b>Risk Analysis And Management:</b> Reactive versus Proactive Risk Strategies, Risk Management Process, Risk Identification, Risk Projection, Risk Refinement, RMMM Plans, Safety Risks and Hazards.	4
6	<b>Software Quality &amp; Configuration Management:</b> Quality Concepts and Software Quality Assurance, Quality principles and Attributes, Quality Audits. Software Reviews, Formal Technical Reviews, The SQA Plan, Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, Software Versioning and Change Control.	5
7	<b>Software Analysis and Design Modeling:</b> The Elements of the Analysis Model, Data Modeling, Functional Modeling and Information Flow, Behavioral Modeling, Software Design and Software Engineering, The Golden Rules, Design Principles and Design Concepts(Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structural Partitioning, Data Structure, Software Procedure ,Information Hiding),Effective Modular Design(Functional Independence, Cohesion, Coupling), Design Documentation.	8
8	<b>Software Coding &amp; Testing:</b> Coding standards & Coding Guidelines, Code Review, Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Software Testing Techniques, Software Testing	5

	Fundamentals, White Box Testing Techniques in detail, Black Box Testing Techniques in detail.	
9	<b>Advance Topics:</b> Clean Room Software Engineering, Web Engineering, Re-Engineering, Computer Aided Software Engineering, Software as a Service, SaaS Architecture, Emergency Trends in Software Engineering, Client/Server Software Engineering.	4
	<b>Total Hours</b>	<b>42</b>

**Reference Books:**

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Editions
2. Ian Sommerville, Software engineering, Pearson education Asia
3. Pankaj Jalote, Software Engineering – A Precise Approach Wiley
4. Software Engineering Fundamentals by Ali Behhforoz & Frederick Hudson OXFORD
5. Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.
6. Engineering Software as a Service and Agile Software Approach, Armando Fox and David Patterson
7. John M Nicolas, Project Management for Business, Engineering and Technology, Elsevier.
8. Nageswara Rao Pusuluri, Software Testing Concepts and Tools, DreamTech
9. Sanjay Mohapatra, Software Project Management, Cengage Learning

**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	20%	10%	30%	20%	10%

**Suggested List of Experiments:**

1. Introduction to GIT and account creation on GIT.
2. Introduction to Team Foundation server tool.
3. Study of Various Testing Tool:

**Win Runner 8.0:** Checkpoints in Winrunner, Data Driven and Batch Testing.

**Load Runner 8.0:** VuserScript Creation, Execution and Result using Load Runner.

**Test Director 8.0:** Site Administrator, Understanding Test Director.

4. Prepare SRS document for considering any specific Social Project in detail

**Instructional Method:**

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in may be using following teaching approaches : black board, or use of any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Practical examination/Viva will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

**Supplementary Resources:**

1. <http://nptel.ac.in/courses/106101061/>
2. <https://www.joelonsoftware.com/>
3. <http://www.codesimplicity.com/>
4. <http://www.sparxsystems.com/products/ea/index.html>
5. URL:<http://www.smartdraw.com>
6. URL:<http://viu.eng.rpi.edu>
7. [www.en.wikipedia.org/wiki/Software\\_engineering](http://www.en.wikipedia.org/wiki/Software_engineering)
8. [www.win.tue.nl](http://www.win.tue.nl)
9. [www.rspa.com/spi](http://www.rspa.com/spi)
10. [www.onesmartclick.com/engsineering/software-engineering.html](http://www.onesmartclick.com/engsineering/software-engineering.html)
11. [www.sei.cmu.edu](http://www.sei.cmu.edu)
12. <https://www.edx.org/school/uc-berkeleyx>