



# SILVER OAK UNIVERSITY

## Engineering and Technology (B.Tech.)

Computer Engineering

Subject Name: Software Engineering

Subject Code: 1010043336

Semester: 5

**Subject Name: Software Engineering**

**Prerequisite: UML**

### Objective:

To study Software Development Life Cycle, Development models and Agile Software development. • To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. • To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing. • To learn the process of improving the quality of software work products. • To gain the techniques and skills on how to use modern software testing tools to support software testing projects. • To expose Software Process Improvement and Reengineering

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ES (V)	PA (I)	
3	0	2	4	60	40	30	20	150

### Contents:

Sr. No.	Topics	Teaching Hrs.
1	<b>INTRODUCTION TO SOFTWARE ENGINEERING:</b> Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process.	04
2	<b>AGILE SOFTWARE DEVELOPMENT:</b> Agility and Agile Process Model, Extreme Programming, Other Process Model of Agile Development and Tools: Adaptive Software Development (ASD), Dynamic Systems Development Method (DSDM), Scrum, Feature Driven Development (FDD), Crystal Agile Modelling (AM), Site Reliability Engineering (SRE), Roles and Types of Standards, ISO 12207: Life Cycle Standard IEEE Standards for Software Engineering Processes and Specifications	05
3	<b>SOFTWARE PROJECT MANAGEMENT:</b> W5HH of Project Management, Software Metrics (Process, Product and Project Metrics), Software Measurement: Metrics for Software Cost and Effort estimations, Software Project Estimation, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation).	04

4	<b>SOFTWARE REQUIREMENT MODELLING AND SPECIFICATION:</b> Requirements Development Methodology, Specifying Requirements (SRS), Eliciting Accurate Requirements ,Documenting Business Requirements , Defining User Requirements, Validating Requirements,	03
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	Achieving Requirements Traceability, Managing Changing Requirements, Reviews, Walkthroughs, and Inspections, Requirements Modeling, Agile Requirements Engineering	
5	<b>SOFTWARE ANALYSIS AND DESIGN:</b> Roles of Analysis and Design, Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool), User Interface Design, Web Application Design.	04
6	<b>SOFTWARE CODING &amp; TESTING:</b> Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner).	05
7	<b>SOFTWARE QUALITY ASSURANCE, SOFTWARE MAINTANANCE AND SOFTWARE CONFIGURATION MANAGEMENT</b> Software Quality Concepts , Types of Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, Software Configuration Management (SCM) , Software Quality Assurance (SQA) , Software Quality and Agile Methods , Automated and Manual Functional Testing ,Acceptance testing , Mock objects, User interface testing (HTTPUnit, Canoo), Performance testing ,Software Metrics and Analytics , Quality and Process Standards and Guidelines , ISO 9000 , SWEBOK , ISO 15504 , SEI's Capability Maturity Model (CMM) , CMM Integration (CMMI) , Software Security Engineering	05
8	<b>DEVOPS:</b> Overview, Problem Case Definition, Benefits of Fixing Application Development Challenges, DevOps Adoption Approach through Assessment, Solution Dimensions, What is DevOps? DevOps Importance and Benefits, DevOps Principles and Practices, 7 C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, How to Choose Right DevOps Tools, Challenges with DevOps Implementation, Must Do Things for DevOps, Mapping My App to DevOps -Assessment, Definition, Implementation, Measure and Feedback	03
9	<b>ADVANCED TOPICS IN SOFTWARE ENGINEERING:</b> Component-Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering, Computer-Aided Software Engineering, Software Process Improvement, Emerging Trends in software Engineering. Data Science for Software Engineers, Measuring User Satisfaction, Software Engineering Ethics	03

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Able to Prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document	3,4
CO-1	Apply the concept of Functional Oriented and Object-Oriented Approach for Software Design.	1,5
CO-1	Recognize how to ensure the quality of software product, different quality standards and software review techniques.	7
CO-1	Apply various testing techniques and test plan in.	6
CO-1	Able to understand modern Agile Development , Devops Concept of Industry and emerging trends of software engineering.	2,8,9

**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 An Agile Software Approach, Armando Fox and DavidPatterson
7. John M Nicolas, Project Management for Business, Engineering and Technology, Elsevier

**List of Tutorials:**

1. Study complete software development life cycle and analyze various activities conducted as a part of each phase.
2. Study software requirements and identify the requirements from any problem statement and develop Software Requirement Specification.
3. Study Object Oriented Design using UML and prepare Use-Case, ER, Activity, Sequence, Class diagrams.
4. Study System Modelling using Data Flow Diagrams.
5. Study Project Estimation techniques, FP analysis and COCOMO model.
6. Study Project Scheduling Techniques /Tools. Critical Path Method (CPM), Project Evaluation and Review Technique (Pert), Gantt Chart And Work-Breakdown Structure.
7. Study Software Risk Analysis and Management.
8. Study Software Testing and designing Test Suites.

9. Study Estimation of Test Coverage Metrics and Structural Complexity.

10. Prepare Case Study of any one topic given below.

Project Management Tools

SCM Tools

SQA Tools

Testing

