COURSE TITLE	**SOFTWARE ENGINEERING**
COURSE CODE	**01AI0510**
COURSE CREDITS	**4**

Objective:

1 To understand and apply various software project management techniques based on Software Engineering guidelines and Principles

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

1 Understand various software engineering principles and their application
2 Demonstrate use of various Agile methodologies for software development
3 Apply various modelling techniques for designing system requirement
4 Identify different types of risk and evaluate its impact on software system
5 Distinguish different testing strategies and Create test cases

Pre-requisite of course: Object Oriented Programming fundamental

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction** 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	**Agile Development** SDLC: Agile Method, Manifesto, Various Agile Modeling Techniques, Scrum, Scrum Reference Card, LSS (LargeScale Scrum), XP, ASD, Crystal	4
3	**Project Management Concepts, Requirement Engineering & Metrics** 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

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Contents : Unit	Topics	Contact Hours
4	**Project Planning Scheduling & Tracking** Software Scope, Feasibility Analysis, Empirical Estimation Models, Defining a Task Set for the Software Project, Defining a Task Network, Scheduling	3
5	**Risk Analysis And Management** Reactive versus Proactive Risk Strategies,, Risk Management Process, Risk Identification, Risk Projection, Risk Refinement, RMMM Plans, Safety Risks and Hazards	4
6	**Software Quality & Configuration Management** 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	**Software Analysis and Design Modeling** 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	**Software Coding & Testing** Coding standards &Coding Guidelines, Code Review, Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Software Testing Techniques, Software Testing Fundamentals, White Box Testing Techniques in detail, Black Box Testing Techniques in detail	5
9	**Advance Topics** Clean Room Software Engineering, Web Engineering, Re-Engineering, Computer Aided Software Engineering, Software as a Service, SaaS Architecture, Emergency Trends in Software Engineering, Client/ServerSoftware Engineering	4
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Introduction to GIT and account creation on GIT	2
2	**Practical 2** Introduction to Team Foundation server tool.	2
3	**Practical 3** Study of Various Testing Tool	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
4	**Practical 4** Data Driven and Batch Testing	2
5	**Practical 5** Prepare SRS document for considering any specific Social Project as per guidelines	12
Total Hours		**20**

Textbook :

1 Software engineering- A practitioner's Approach, Roger S.Pressman, McGraw-Hill International Editions, 2010

References:

1 Software engineering, Software engineering, Ian Sommerville, Pearson education Asia, 2010

2 Software Engineering – A Precise Approach, Software Engineering – A Precise Approach, Pankaj Jalote, Wiley, 2014

3 Project Management for Business, Engineering and Technology, Project Management for Business, Engineering and Technology, John M Nicolas, Elsevier, 2012

Suggested Theory Distribution:

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

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
0.00	10.00	40.00	30.00	20.00	0.00

Instructional Method:

1 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.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination/Viva will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

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Supplementary Resources:

1 http://nptel.ac.in/courses/106101061/
2 https://app.diagrams.net
3 https://se-iitkgp.vlabs.ac.in

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