Course Code	Course Title	L	T	P	C
PMCA504L	**Software Engineering**	3	0	0	3
Pre-requisite	NIL	Syllabus version
		1.0

Course Objectives:

1. To teach the concepts of process, product and project.
2. To elucidate the knowledge of requirement analysis.
3. To provide the knowledge of software design and testing.

Course Outcomes:

1. Demonstrate the basics of software engineering process, ethics and development
2. Understand the concept of various process models, activities and improvement
3. Analyze the various aspects of software requirement engineering and system models
4. Understand and analyze the decisions about the UML design process
5. Implement a computer-based system to meet the desired needs of the customer with proper understanding of the critical systems development and software testing

Module:1	Introduction to Software Engineering	5 hours

Nature of Software, Software Engineering - Need, Importance and its Characteristics - Software Process - Generic Process Model - Prescriptive Process Model Specialized, Unified Process, Classical Evolutionary models, Personal and Team Process Model - Software Project Metrics

Module:2	Agile Development	5 hours

Agile Process - Agility Principles - Adaptive Software Development - Extreme Programming Scrum - Dynamic Systems Development Method - Crystal - Feature Driven Development - Lean Software Development - Agile Modelling - Agile Unified Process

Module:3	Requirements Engineering	7 hours

Requirements Engineering, Establishing the Groundwork, Requirements Gathering, Developing Use Cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements - Requirements Monitoring, Validating Requirements

Module:4	Object Oriented Design	7 hours

Design Concepts - Architectural Design - Object Oriented Design using UML - Interactions - Use Cases - Use Case Diagrams - Interaction Diagrams - Activity Diagrams - State Machines - Processes and Threads - Time and Space - State Chart Diagrams - Components - Deployment Diagram

Module:5	Software Quality Assurance and Management	7 hours

Software Quality - Quality Factors- The Software Quality Dilemma - Achieving Software Quality, Reviews - Criteria for Types of Reviews - Informal Reviews - Formal Technical Reviews, Software Quality Assurance - Elements of Software Quality Assurance - SQA Processes and Product Characteristics - SQA Tasks, Goals, and Metrics - Formal Approaches to SQA - Statistical Software Quality Assurance - Software Reliability - The ISO 9000 Quality Standards - The SQA Plan

Module:6	Software Testing and Evolution	6 hours

Strategic Approach to Software Testing, Planning and Recordkeeping, Test-Case Design, White Box Testing, Black-Box Testing, Object-Oriented Testing, Integration Testing, Artificial Intelligence and Regression Testing, Integration Testing in the OO Context, Validation Testing, Testing Patterns

Module:7	DevOpS	6 hours

DevOps - Motivation - Cloud as a Platform - Operations - Deployment Pipeline – Overall Architecture - Building and Testing – Deployment – Crosscutting Concerns- Monitoring- Security and Security Audits-Other Ileitis- Business Considerations- Case study - Migrating to Microservices

Module:8	Contemporary Issues	2 hours

Guest Lecture from Industry and R & D Organizations

		Total Lecture Hours:	45 hours

Text Book(s)	
1.	Roger S Pressman and Bruce Maxim, "Software Engineering - A Practitioner's Approach", 2019, 9th Edition, McGraw Hill Higher Education.

Reference Books	
1.	Ian Sommerville, "Software Engineering", 2017, 10th Edition, Addison-Wesley.
2.	Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Languages User Guide", 2019, Addison Wesley.
3.	Len Bass, Ingo Weber and Liming Zhu, "DevOps: A Software Architect's Perspectivell", 2017, Pearson Education.

Mode of Evaluation: CAT, Written Assignment, Quiz, FAT and Seminar

Recommended by Board of Studies	04-05-2023		
Approved by Academic Council	No. 70	Date	24-06-2023