No:-   Date:

CS050601: Software Engineering

L-T-P-Cr: 3–0–2-4

Pre-requisites: Basic knowledge of programming concepts.

Course/Overviews:

The main purpose of this course is to impart knowledge on the principles of software engineering, software design, professional ethics, make aware of the organization and team structures, Software Quality metrics and Management

Course Outcomes:

At the end of the course, a student should:

Sl. No:	Outcomes	Program Outcomes
1.	Students demonstrate the ability to develop a high-quality software system while working in a project group.	PO-4
2.	Students have the ability to identify software development needs and challenges that require various engineering solutions, and formulate such solutions.	PO-7
3.	Students have a thorough understanding of professional, ethical and social responsibilities	PO-8, PO-10
4.	Students are able to analyze the impact of computing and engineering solutions on individuals, organizations, and society	PO-11
5.	Students are capable to develop their software projects using modern engineering techniques and tools.	PO-12
6.	Students demonstrate the ability to apply a range of design and development principles in the construction of a software system.	PO-04

UNIT I: Lectures: 10

Introduction: S/W Engineering Discipline-Evolution and Impact, Program vs S/W Product, Emergence of S/W Engineering.

Software Life Cycle Models: Waterfall, Prototyping, Evolutionary, Spiral models and their comparisons.

Software Project Management: Project Manager responsibilities, Project Planning, Project Size estimation Metrics, Project estimation Techniques, COCOMO, Staffing Level Estimation, Scheduling, Organization & Team Structures, Staffing, Risk Management, S/W Configuration Management.

UNIT II: Lectures: 11

Requirements Analysis and Specification: Requirement Gathering and Analysis, SRS, Formal System Development Techniques, Axiomatic and Algebraic Specification.

Software Design: Overview, Cohesion and Coupling, S/W Design Approaches, Object-Oriented vs. Function-Oriented Design.

Function-Oriented S/W Design: SA/SD Methodology, Structured Analysis, DFDs, Structured Design, Detailed Design, Design Preview.

UNIT III: Lecture: 11

Object Modelling Using UML: Overview, UML, UML Diagrams, Use Case Model, Class Diagrams etc.

Object-Oriented Software Development: Design Patterns, Object-Oriented analysis and Design Process, OOD Goodness Criteria.

User Interface Design: Characteristics, Basic Concepts, Types, Components Based GUI Development, User Interface Design Methodology.

UNIT IV: Lectures: 10

Coding and Testing: Coding, Code Review, Testing, Unit Testing, Black Box Testing, White-Box Testing, Debugging, Program Analysis Tools, Integration Testing, System Testing, General Issues.

Software Reliability and Quality Management: S/W Reliability, Statistical Testing, S/W Quality, S/W Quality Management System, ISO 9000, SEI CMM, Personal Software Process, Six Sigma.

Software Maintenance: Characteristics, S/W Reverse Engineering, S/W Maintenance Process Models, Estimation of Maintenance Cost

Text / Reference Books:

1. Fundamentals of Software Engineering by Rajib Mall, PHI
2. Software engineering by James F. Peters, Wiley
3. Software engineering A Practitioner's Approach by Pressman , MGH
4. Software Project Management From Concept to Deployment by Kieron Conway, dreamtech Press
5. Software engineering, by Sommerville, Pearson education.