Subject Name: Software Engineering

Subject Code: CE 603

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
03	00	02	05	4	3	70	30	20	30	150

Learning Objectives:

- To learn and understand the Concepts of Software Engineering
- To Learn and understand Software Development Life Cycle
- To apply the project management and analysis principles to software project development.
- To apply the design & testing principles to software project development.

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	Introduction	3
2	Software Development Process Models	6
3	Software Requirement Analysis and Specification	9
4	Software Design	5
5	Coding	4
6	Software Testing and Quality Assurance	7
7	Managing Software Projects	9
8	Current trends in Software Engineering	2

Total hours (Theory): 45

Total hours (Lab): 30

Total hours: 75

Detailed Syllabus

Sr. No	Topic	Lecture Hours	Weight age (%)
1	**Introduction** Software What is software? Types of software Characteristics of Software Attributes of good software Software Engineering What is software engineering? Software engineering costs What are the key challenges facing software engineering? Systems engineering & software Engineering	3	10
2	**Software Development Process Models** What is a software process? What is a software process model? The waterfall model Evolutionary development Component-Based Software Engineering (CBSE) Process Iteration Incremental delivery Spiral development Rapid software development Agile methods Extreme programming Rapid application development (RAD) Software prototyping Computer Aided Software Engineering (CASE) Overview of CASE approach Classification of CASE tools	6	10
3	**Software Requirement Analysis and Specification** System and software requirements Types of software requirements Functional and non-functional requirements Domain requirements User requirements Elicitation and analysis of requirements Overview of techniques Viewpoints Interviewing Scenarios Use-cases Process modeling with physical and logical DFDs Entity Relationship Diagram Data Dictionary	9	15

	Requirement validation Requirement specification Software requirement Specification (SRS) Structure and contents SRS format Feasibility		
4	**Software Design** Design concepts Abstraction Architecture Patterns Modularity Cohesion Coupling Information hiding Functional independence Refinement Design of input and Control Design of User Interface design Elements of good design Design issues Features of modern GUI - Menus, Scroll bars, windows, Buttons, icons, panels, error Messages etc.	5	10
5	**Coding** Programming languages and development tools Selecting languages and tools Good programming practices Coding Standards	4	5
6	**Software Testing and Quality Assurance** Verification and validation Techniques of testing Black-box and White-box testing Inspections Levels of testing Unit testing Integration Testing Interface testing System testing Alpha and beta testing Regression testing Design of test cases Quality management activities Product and process quality Standards ISO9000 Capability Maturity Model (CMM)	7	15

7	**Managing Software Projects** Need for the proper management of software projects Management activities Project planning Software Size Estimation and Cost Estimation Software Estimation –Size Estimation Function Point Analysis LOC Estimation What is Productivity COCOMOII Project scheduling Task set for Software project Defining a task network Scheduling Earned value analysis Risk management Reactive versus proactive Software Risk Risk Identification Risk projection, Risk refinement Risk mitigation, monitoring & management-The RMMM Managing people	9	30
8	**Current trends in Software Engineering** Software Engineering for projects and products. Introduction to Web Engineering and Agile process	2	5
	Total	**45**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcome:

Software engineering is a subject that emerged recently as a result of the need to manage software projects that are rising in demand day by day. Software is developed in diverse areas and the fact that a systematic approach is required to manage their development spawns this interesting subject of study.
After successfully completing this module the student will be able to explain the software engineering principles and techniques that are used in developing quality software products.

Reference Books:

1. Software Engineering: A practitioner's approach by Roger S. Pressman, 7th edition, McGraw-Hill International edition
2. Software Engineering by Ian Sommerville, 7th edition, Addison-Wesley.
3. Fundamentals of Software Engineering by Rajib Mall

List of experiments:

Pract. No.	Title
1.	Preparing Software Requirements Specifications
2.	Identifying Domain Classes from the Problem Statements
3.	Modeling UML Class Diagrams and Sequence diagrams
4.	Modeling UML Use Case Diagrams and Capturing Use Case Scenarios
5.	E-R Modeling
6.	State chart and Activity Modeling
7.	Modeling Data Flow Diagrams
8.	Estimation of Project Metrics
9.	Estimation of Test Coverage Metrics and Structural Complexity
10.	Designing Test Suites
11.	Preparing Final Project Report