GUJARAT TECHNOLOGICAL UNIVERSITY

Master in Computer Application (Integrated MCA)

Year III-(Semester-VI) (W.e.f. December, 2015)

Subject Name: Software Engineering (SE)

Subject Code: 4460602

1. **Learning objectives:**
   - ➢Understand, Analyze and Model User’s Requirements
   - ➢Select Appropriate Process0020Model Apply it to All Stages of Software Development Life Cycle (SDLC)
   - ➢Select and Apply Appropriate Design Methodology
   - ➢Decide the Feasibility of Using and Applying Agile Development Process
   - ➢Assure Software Quality, Select and Apply Appropriate Testing Strategies
   - ➢Select and Apply Appropriate Metrics to Estimate Software Size, Effort, and Cost
   - ➢Prepare Project Schedule, and Monitor the Project Progress
   - ➢Understand the Characteristics and Applicability of Various Software Tools

2. **Prerequisites:** Systems & Object Oriented Design Methodologies

3. **Contents:**

Unit No.	Course Content	No of Lectures
1	**Introduction to Software Engineering & Process Models** Software, Software Engineering, Software Characteristics, Software Application, Software Process, Layered Technology Process Models – Waterfall, Incremental, Evolutionary Process Model – Prototype, Spiral and concurrent Development Model Agile Process; Extreme Programming (XP); Brief Overview of Other Agile Process Models: Adaptive Software Development, Scrum	**08**

2	**Principles of Software Engineering; and Requirements Modelling**
	Introduction; Core Principles of Process and Practice; Principles Guiding Each Framework Activity;
	Requirements Engineering; Groundwork for Understanding of Software Requirements; Overview of Eliciting Requirements, Developing Use Cases, Building the Requirements Model; Negotiating Requirements; Validating Requirements;
		07

	Requirement Modelling Strategies; Overview of Flow-Oriented Modelling, Behavioural Modelling; Requirements Modelling for WebApps	
3	**Design Concepts; and Architectural Design** Design Concepts; Design Model; Architectural Styles, Architectural Design; Assessing Alternative Architectural Designs; Architectural mapping Using Data Flow	**05**
4	**Component-Level Design** Three Views of Component; Designing Class-Based Components; Conducting Component-Level Design; Component-Level Design for WebApps; Designing Traditional Components, Component-Based Development	**04**

5	**User Interface Design; Design Patterns; and WebApp Design**
	Golden Rules of User Interface Design; User Interface Analysis and Design; Interface Analysis; Interface Design; WebApp Interface Design; Design Evaluation;
	Design Patterns; Pattern-based Software Design; Architectural Patterns; Component-Level Design Patterns; User Interface Design Patterns; WebApps Design Patterns;
	WebApp Design Quality; WebApp Design Goals; Design Pyramid for WebApp; WebApp Interface Design; Aesthetic Design of WebApp; Content Design for WebApp; Architecture Design; Navigation Design; Component-Level Design; Object-Oriented Hypermedia Design Method
		08

6	**Software Review; Software Testing; and Software Metrics** Overview of Review Techniques A Strategic Approach to Software Testing; Strategic Issues; Test Strategies for Conventional Software; Test Strategies for Object Oriented Software; Test Strategies for WebApps; System Testing; Debugging; Software Testing Fundamentals; White-Box Testing; Basis Path Testing; Control Structure Testing; Black-Box Testing; Testing for Specialized Environments; Patterns and Software Testing; Testing Concepts for WebApps; An Overview of Testing Process for WebApps; Content Testing; User Interface Testing; Component-Level Testing; Navigation Testing; Configuration Testing; Security Testing; Performance Testing	**08**
7	**Product Metrics; and Software Project Estimation** Framework for Product Metrics; Metrics for Requirements Model; Metrics for Design Model; Design Metrics for WebApps; Metrics for Source Code; Metrics for	**06**

	Testing; Metrics for Maintenance; Software Project Estimation; Decomposition Techniques; Empirical Estimation Models; Estimation for O_O Projects, Estimation for Agile Development and webapps projects Overview of Project Scheduling	
08	**Overview : Software Project Management** Management Spectrum (People, Product, Process and Project), W5HH Principle	**02**

4. Reference Book(s):

Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, 7th Edition, McGraw Hill Publications

5. Suggested Additional Reading:

1. Sommerville, “Software Engineering”, 8th Edition, Pearson Education
2. Waman S. Jawadekar, “Software Engineering – Principles and Practices”, TMGH Publication
3. Pankaj Jalote, “Software Engineering – A Precise Approach”, Wiley India
4. Waman S. Jawadekar, “Software Engineering – A Primer”, TMGH Publication
5. Shari Lawrence Pfleeger and Joanne M. Atlee, “Software Engineering – Theory and Practice”, 3rd Edition, Pearson Education
6. M. G. Limaye, “Software Testing – Principles, Techniques and Tools”, TMGH

6. Chapter wise Coverage from Main Reference Book(s):

Unit	Topics
1	1.1 to 1.4, 2.1 to 2.3 , 3.3, 3.4 , 3.5.1, 3.5.2
2	Ch-4, 5, 7
3	Ch-8.3, 8.4, 9.1.1, 9.3 to 9.6
4	Ch-10
5	Ch-11,12,13
6	Ch-15 , 17, 18, 20
7	Ch-23, 26.5 to 26.9, 27.5
8	Ch- 24

7.Suggestions for Tutorial Sessions :

I) **Activity : Software Testing tools**

A) **Tool : JMeter**

B) **Tasks**

a. Usage of Software testing tool (JMeter) for functional / Regression testing,
b. creation of test script for unattended testing,
c. synchronization of test case,
d. Rapid testing,
e. Performance testing of a data base application and HTTP connection for website access.

II) **Activity : Project Planning**

A) **Tool : ProjectLibre, LibrePlan, GnattProject, Open Project**

B) **Tasks**

a. Resource Management
b. Scheduling
c. Task Management / Tracking
d. Gnatt Charts

8.Accomplishments

Students will understand a high-level overview of the software development process. Student will understand various activities of software engineering like software requirements, software design, software construction, software management, and software quality etc.