GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Computer Applications

Level: Post Graduate

Course / Subject Code: MC03094021

Course / Subject Name : Software Engineering

w. e. f. Academic Year:	2025-26
Semester:	3
Category of the Course:	Core Courses

Prerequisite:	Systems & Object Oriented Design Methodologies, Programming experience of higher level languages.
Rationale:	The course intends to introduce the concepts of software engineering and software development. The course provides the opportunities for the learner to learn the the fundamentals, software processes and agile development process. This course also covers the requirements engineering and its use in software modeling and design. This course equips the learner with the knowledge of software testing, reliability engineering, project and quality management.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Describe the concepts of software engineering, software process model and agile development.	UN
02	Discuss requirement engineering concepts and their use in system modeling.	UN
03	Discuss architectural design, object oriented design and related implementation.	UN
04	Describe various software testing and reliability engineering aspects.	UN
05	Discuss importance of project management and quality management.	UN

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
4	0	0	4	70	30	0	0	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction:** Professional Software development, Software engineering ethics, Case studies.	12	20

	Software processes: Software process models, Process activities, Coping with change, Process Improvement. **Agile software development:** Agile methods, Agile development techniques, Agile project management, Scaling agile methods.		
2.	**Requirements engineering:** Functional and nonfunctional requirements, Requirements engineering processes, Requirement elicitation, Requirement specification, Requirement validation, Requirements change. **System modeling:** Context models, Interaction models, Structural models, Behavioral models, Model driven architecture.	12	20
3.	**Architectural design:** Architectural design decisions, Architectural views, Architectural patterns, Application architecture. **Design and Implementation:** Object oriented design using the UML, Design patterns, Implementation issues, Open source development.	12	20
4.	**Software testing:** Development testing, Test-driven development, Release testing, User testing. **Reliability engineering:** Availability and reliability, Reliability requirements, Fault-tolerant architectures, Programming for reliability, Reliability measurement.	12	20
5.	**Project management:** Risk management, Managing people, Teamwork. **Quality management:** Software quality, Software standards, Review and inspections, Quality management and agile development, Software measurement.	12	20
	Total	**60**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	50	40	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

Text book:

- Sommerville , Software Engineering , 10th edition, Pearson

Reference Books:

- Roger S. Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill Publications
- Chandramouli Subramanian, Saikat Dutt, Chandramouli Seetharaman,B G Geetha, Software Engineering, Pearson
- Waman S. Jawadekar, Software Engineering– Principles and Practices, TMGH Publication
- Blaha, Rumbaugh, Object Oriented Modeling and Design with UML, 2e, Pearson
- Pankaj Jalote, Software Engineering –A Precise Approach, Wiley India
- Behhforoz & Frederick Hudson, Software Engineering Fundamentals, OXFORD
- Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.

(b) Open source software and website:

- Faculty can suggest any online course from NPTEL, EdX, Coursera, Udemy , Agile and Scrum platforms (Based on availability of the course at the time of teaching learning as course availability remains changing.)

Various Web Based SE Tools

- Software:-Rational Rose, Microsoft Visio, Enterprise resource planning
- Project Management Tools
- SCM Tools
- SQA Tools
- Analysis and Design Tools
- User Interface Development Tools
- Object-Oriented Software Engineering Tools
- Testing Tools

Suggested Activities for Students, if any:

- ICT enabled Classroom teaching
- Case study
- Assignments
- Interactive class room discussions

CO- PO Mapping:

Semester 3	Course Name: Software Engineering							
	POs							
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1	2	-	-	2	1	-
CO2	3	3	3	1	-	-	-	-
CO3	3	2	3	1	-	-	-	-
CO4	3	2	3	1	-	-	-	-
CO5	2	-	1	-	-	3	-	-

*Legend: '**3**' for high, '**2**' for medium, '**1**' for low and '**-**' for no correlation of each CO with PO.*

Note: The CO-PO mapping is indicative; the institute/faculty member can change as required.

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