GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Computer Applications

Level: UG

Course / Subject Code: BC04001021

Course / Subject Name: Software Engineering

w. e. f. Academic Year:	2024-25
Semester:	4
Category of the Course:	Core Course (CC)

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, user interface design, risk analysis and team management.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	To understand the concepts of software engineering, software process model and requirement engineering, analysis, modeling.	U, A
02	To understand architectural design, object-oriented design and related implementation.	U, A
03	To understand User Interface design and software coding.	U
04	To understand risk analysis, communication and team management.	U
05	To understand software testing and Agile software development.	U

**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:** Introduction to software engineering, software process, software process models, software product. **Requirement engineering principles:** Introduction, what is requirement engineering? Importance of requirements, Types of requirements, Steps involved in requirements engineering. **Requirement analysis modeling:** Analysis modeling approaches, Structured analysis, Object oriented analysis	15	25
2.	**Design and Architectural Engineering:** Design process and concepts, Basic issues in software design, Characteristics of a good design, Software design and software engineering, Modularity, cohesion, coupling, layering. **Object oriented concepts:** Introduction, Fundamental parts, Data hiding and class hierarchy creation, Relationships, Role of UML, Design patterns, Frameworks. **Object oriented analysis and design**	15	25
3.	**User Interface design:** Concepts, Elements, Designing, Evaluation, Golden rules, Models, Usability. **Software Coding:** Introduction, Programming principles, Programming guidelines, Coding conventions, Key concepts.	6	10
4.	**Risk analysis and management:** Introduction, Software risk, Types of risk, Plan risk management. **Communication and team management:** Introduction, Dimensions of communication, Forms of communication, Process of communication, Handling communication in a project, Project performance report, Managing the project team.	12	20
5.	**Introduction to software testing:** Introduction, Psychology of testing, Software testing scope, objectives, strategic approach, Types of software testing. **Introduction to Agile software development:** What is Agile? Various characteristics, Manifesto, Generic Agile project life cycle, Agile concepts, Epics, Features, User stories, Communication in Agile projects, Different Agile methodologies.	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**
15	75	10	-	-	-

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:

- Chandramouli Subramanian, Saikat Dutt, Chandramouli Seetharaman, B G Geetha, Software Engineering, Pearson

Reference Books:

- Roger S. Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill Publications
- Sommerville , Software Engineering , 10th edition, 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 remain changing.)

Various Web Based SE Tools

- Software:-Rational Rose, Microsoft Visio, Enterprise resource planning
- 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 classroom discussions

CO- PO Mapping:

Semester 4	**Course Name : Software Engineering**										
	POs										
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3	2	-	-	-	1	-	-	-	-
CO2	3	3	3	-	1	-	1	-	-	-	-
CO3	3	2	3	-	1	1	1	-	-	-	-
CO4	3	2	1	-	1	-	1	1	2	-	2
CO5	2	1	2	-	3	-	1	1	-	-	-

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

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