



SARVAJANIK UNIVERSITY
Sarvajani College of Engineering and Technology
Master of Computer Applications



Integrated MCA II Semester 3

Subject Name: Software Engineering

Subject Code: IMCA13305

Type of course: Professional Core Course

Prerequisite (if any):

- Basic understanding of Software, Applications, and Programming Fundamentals.

List of Courses where this course will be a prerequisite:

- Systems & Object Oriented Design Methodologies

Rationale:

The Software Engineering course aims to provide an understanding of software development through process models, requirement engineering, and design with UML, testing strategies, and project management for high-quality software delivery.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
3	0	0	3	60	40	-	-	100

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests) **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course





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Content:

Sr. No.	Content	Teaching Hrs.	Module Weightage
1.	Introduction to Software Engineering and Process Models. Software and its Characteristics, Software Application Domains, Software Engineering and Layered Technology, The Software Process, and Software Myths. Process Models: A Generic Process Model - Defining a Framework Activity, The Waterfall Model, Incremental Process Models, Evolutionary Process Models - Prototyping Model, The Spiral Model. Software Requirement Analysis And Specification. Requirement gathering using Use Case Diagram	11	25%
2.	Agile Methodologies Agile Development: Introduction to Agile development model, Benefits of Agile model, Agility and Agile Process, Agile Process model, Adaptive Software Development, Dynamic Systems Development Method, Crystal, Feature Driven Development and Agile Modeling, Scrum and Self-Organizing, Scrum Planning and Collective Commitment, Sprint, Scrum Master, Product Owner, Development Team, Retrospective, XP and Embracing change.	10	20%
3.	Software Design Design: Design Process, Design Concepts, The Design Model, Software Design, Cohesion and Coupling, Architectural Design Patterns (MVC, Client-Server, and Layered Architecture), Design Documentation using UML (Class Diagrams and Sequence Diagrams).	12	25%
4	Testing Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for Web Apps, Test Strategies for Mobile Apps, Validation Testing, System Testing, and Debugging. Testing Conventional Applications: Software Testing Fundamentals.	6	15%





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5.	Review Techniques & Managing Software Project Review Techniques, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation For Object-Oriented Projects, and Scheduling.	6	15%
	Case Study: 1. Online Railway Reservation System (IRCTC) Context: Managing train reservations, ticket cancellations, and passenger inquiries. <ul style="list-style-type: none">● Use Case Diagram: Ticket booking, ticket cancellation, payment process, checking train status.● Class Diagram: Passenger, Train, Ticket, Payment, and Admin.● Sequence Diagram: Steps for booking a ticket or cancelling a reservation. 2. Food Delivery Application (Example: Zomato, Swiggy) Context: A system for ordering food from restaurants in India. <ul style="list-style-type: none">● Use Case Diagram: Order food, track delivery, rate service, and customer support.● Class Diagram: Customer, Restaurant, Order, Delivery Partner, and Payment.● Sequence Diagram: Placing an order, assigning a delivery partner, and completing the delivery. 3. Hospital Management System for Indian Hospitals Context: Managing patient records, appointments, and billing. <ul style="list-style-type: none">● Use Case Diagram: Patient registration, appointment scheduling, bill payment, and discharge.● Class Diagram: Patient, Doctor, Appointment, Bill, and Department.● Sequence Diagram: Scheduling an appointment and generating a bill. 4. E-Commerce Platform for Indian Handicrafts (Example: FabIndia) Context: An online platform for buying traditional Indian handicrafts. <ul style="list-style-type: none">● Use Case Diagram: Product browsing, order placement, payment, and delivery tracking.● Class Diagram: User, Product, Cart, Order, Payment, and Delivery.● Sequence Diagram: A user placing an order and making a payment.		





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Suggested Specification table with Marks (Theory):

%Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	35	20	15	0	0

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate
 C: Create and above Levels (Revised Bloom’s Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Software Engineering A practitioner’s Approach	Roger S Pressman, Bruce R. Maxim	McGraw Hill Education	2015	8 th edition
2.	Software Engineering	Ian Somerville	Pearson education	2015	10 th edition
3.	Fundamentals of Software Engineering	Rajib Mall	PHI Learning	2018	5 th edition
4	Software Engineering - A Precise Approach	Pankaj Jalote	Wiley India	2011	-
5.	Software Engineering	Stephen Schach	McGraw-Hill	2007	7 th edition

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO1	Describe software engineering principles, process models, and methodologies	25





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CO2	Apply requirements engineering techniques to collect software requirements.	20
CO3	Apply design concepts and develop Use Case and Class diagrams for system development	25
CO4	Explore software testing strategies for different applications	15
CO5	Apply project management techniques for efficient software delivery	15

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13
CO-1	3	3	1	3	1	3	1	1	1	1	1	1	1
CO-2	3	1	3	3	1	1	3	1	1	1	1	3	1
CO-3	3	1	3	3	1	3	1	1	1	1	1	1	1
CO-4	1	3	1	3	3	1	1	1	1	1	1	1	1
CO-5	5	1	1	1	3	1	1	1	3	3	3	3	3
Rationale*													

Rationale*: Explaining why it is matching this particular program outcome

List of Open learning website:

https://www.tutorialspoint.com/software_engineering/index.htm

<https://www.geeksforgeeks.org/software-engineering/>

<https://www.javatpoint.com/software-engineering>

List of Open-Source Software: StarUML, ArgoUML

Major Equipment Needed: NA

