Integrated MCA II Semester 4

Subject Name: Software Quality Assurance **Subject Code:** IMCA13407

Type of course: Professional Core Course

Prerequisite (if any):
- Software Engineering

List of Courses where this course will be prerequisite:
- Project Development

Rationale: Software Quality Assurance focuses on ensuring software reliability by integrating QA practices, testing strategies, automation tools, and management components throughout the SDLC to enhance software quality, performance, and cost-efficiency.

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

Content:

Sr. No.	Content	Teaching Hrs.	Module Weightage
1	**Introduction to Software Quality and Assurance, Components of SQA** The Software Quality Challenge, Software Quality, Software Quality Factors, The Components Of The Software Quality Assurance System – Overview.	7	15%
2	**SQA Components in the Project Life Cycle** Integrating Quality Activities in the Project Life Cycle, Reviews	5	15%
3	**Software Testing Strategies & Implementation** **Software Testing Strategies** - Software Test Classifications, White Box Testing - Equivalence class partitioning, Boundary Value Analysis, Black Box Testing - Basic Concepts, Statement Coverage, Branch Coverage, Condition coverage, path coverage, McCabe's Cyclomatic Complexity Metric, Data Flow-based Testing, Mutation Testing , **Software Testing implementation** - The testing process, Test Case Design, Automated testing, Alpha and Beta testing programs, CASE tools and their effect on software quality	16	35%
4	**Management components of software quality** Project Progress Control, Software Quality metrics, Costs of software quality.	7	15%
5	**Software Testing Automation Tools** Functional Testing Tools, API Testing Tools, Mobile Testing Tools, Performance Testing Tools, Test Management Tools, Continuous Integration/Continuous Deployment (CI/CD) Tools.	10	20%

	Selenium - Introduction to Selenium and Its Role in Functional Testing, Selenium Architecture and WebDriver Framework, Locators and Web Element Interactions, Selenium Test Frameworks and Testing Strategies.		

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	15	15	15	15

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 Quality Assurance	Daniel Galin	Pearson Publication	2009	1st Edition
2	Software Testing & Quality Assurance-Theory and Practice	K shirsagar Naik and PriyadarshiTripathy	Wiley	2011	1st Edition
3	Effective Methods For Software Testing	William E. Perry	WILLEY	2006	3rd Edition
4	Fundamentals of Software Engineering	Rajib Mall	PHI Learning	2018	5th edition

5	Software Testing: Principles and Practices	Srinivasan Desikan and Gopalaswamy Ramesh	Pearson Education	2006	

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Understanding Software Quality Assurance architecture and itsimportance.	15%
CO-2	Software quality activities in the project life cycles.	15%
CO-3	Master Software Testing Strategies, Techniques, and Implementation.	35%
CO-4	Understand Management Components of Software Quality learn various software quality metrics.	15%
CO-5	Understand Software Testing Automation Tools and Selenium.	20%

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	2	3	1	3	1	2	1	2	1	2	1
CO-2	3	2	3	3	1	2	2	2	1	2	2	3	2
CO-3	3	1	3	3	1	3	2	2	1	1	1	2	2
CO-4	2	3	2	3	3	1	2	2	1	2	1	2	2
CO-5	1	1	2	3	2	2	3	3	3	3	3	3	3
Rationale*													

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