Uka Tarsadia University

B. Tech.

Semester VI

SOFTWARE QUALITY ASSURANCE (CE5024)

Effective from June-2023

Syllabus version: 1.00

Subject Code	Subject Title	Teaching Scheme			
		Hours		Credits	
		Theory	Practical	Theory	Practical
CE5024	Software Quality Assurance	3	2	3	1

Subject Code	Subject Title	Theory Examination Marks		Practical Examination Marks	Total Marks
		Internal	External	CIE	
CE5024	Software Quality Assurance	40	60	50	150

Objectives of the course:

- To understand software quality basics, contract reviews, and seamless SQA integration into project life cycles.
- Develop skills in managing software quality infrastructure including procedures, documentation, training, and configuration management.
- To manage software quality through effective project progress control, metrics, and understand certifications and CMMI-SQA relationships.

Course outcomes:

Upon completion of the course, the student shall be able to,

CO1: Understand the basics the basic concepts of software quality, software quality factors and overview software quality assurance system components.

CO2: Conduct contract reviews, ensuring effective implementation and integration with development and quality plans.

CO3: Integrate SQA components into project life cycles, conduct comprehensive testing, assure quality in maintenance, and manage external contributions.

CO4: Manage software quality infrastructure, including procedures, documentation, training, corrective actions, and configuration management.

CO5: Manage software quality, employing project progress control, software metrics, and understanding associated costs and limitations.

CO6: Understand the significance of certifications and the relationship between CMMI and SQA.

Sr. No.	Topics	Hours
	Unit – I	
1	**Introduction to Software Quality Assurance:** The software quality challenge, Whatis software quality?Softwarequality	6

	factors, Thecomponents of the software quality assurance system –an overview.	
Unit – II		
2	**Pre-project Software Quality Components:** Contract review – The contract review process and its stages, Contract review objectives, Implementation of a contract review, Contract review subjects, Development and quality plans.	8
Unit – III		
3	**SQA Components in the Project Life Cycle:** Integrating quality activities in the project life cycle, Reviews, Software testing strategies, Software testing implementation, Assuring the quality of software maintenance components, Assuring the quality of external participants' contributions, CASE tools and their effect on software quality.	9
Unit – IV		
4	**Software Quality Infrastructure Components:** Procedures and work instructions, Supporting quality devices, Staff training and certification,Corrective and preventive actions, Configuration management, Documentation control.	8
Unit – V		
5	**Management Components of Software Quality:** Project progress control, Software quality metrics, Costs of software quality, Objectivesof cost of software quality metrics, The classic model of cost of software quality, An extended model for cost of software quality.	8
Unit – VI		
6	**Standards, Certification and Assessment:** Quality management standards, SQA project process standards – IEEE software engineering standards.	6

Sr. No.	**Software Project Management(Practicals)**	**Hours**
1	Study software quality assurance (SQA) system components and their roles in the development process.	2
2	Perform contract reviews to ensure alignment with quality objectives and standards.	4
3	Implement contract requirements effectively and integrate them with development and quality plans.	4

4	Study SQA process frameworks and methodologies, including ISO standards and CMMI, and use of frameworks in software development projects.	6
5	Manage external contributions and ensure their adherence to quality standards.	4
7	Study the importance of documentation in SQA, and demonstrate document test plans, summary reports, and metrics.	6
8	Demonstrate commonly used SQA tools and technologies for test management, automated testing, and performance testing.	4

Text book:

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009.

Reference books:

1. G. Gordon Schulmeyer,"Handbook of Software Quality Assurance", Artech House, 2008.
2. Rajiv Chopra, "Software testing – A Self-Teaching Introduction", Mercury Learning and Information.

Course objectives and Course outcomes mapping:

- To understand software quality basics, contract reviews, and seamless SQA integration into project life cycles: CO1,CO2, and CO3
- Develop skills in managing software quality infrastructure, including procedures, documentation, training, and configuration management: CO4
- To manage software quality through effective project progress control, metrics, and understand certifications and CMMI-SQA relationships: CO5 and CO6

Course units and Course outcomes mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Software Quality Assurance	✓					
2	Pre-project Software Quality Components		✓				
3	SQA components in the Project Life Cycle			✓			
4	Software Quality Infrastructure Components				✓		
5	Management Components of Software Quality					✓	

6	Standards, certification and assessment						✓

Programme outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme outcomes and Course outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6

PO1	✓		✓			
PO2	✓	✓	✓			✓
PO3	✓	✓	✓		✓	
PO4			✓	✓		
PO5			✓	✓	✓	
PO6						
PO7						
PO8						
PO9						
PO10						
PO11		✓		✓		✓
PO12						