Third Year B.C.A. (Under Science) Semester V

Course Code: BCA 503   **Course Title: Software Quality Assurance**

Total Contact Hours: 48 hrs.   **Total Credits: 04**   **Total Marks: 100**
(60 Lectures)

Teaching Scheme: Theory- 05 Lect./ Week

Pre-requisites (if any) :
1.   Basic concepts of Software Engineering

Course Objectives:
1. To **u**nderstand the basic of quality software and quality factors.
2. To understand software quality architecture and component.
3. To understand software project life cycle, infrastructure and software quality standards.

Unit No.	Contents	No. of Lectures
Unit 1	**1. Introduction to Software Quality.** 1.1. Uniqueness of software quality assurance 1.2. Software, Software errors, Faults and Failures 1.3. Classification of the causes of software errors 1.4. Software quality, Software quality assurance and software engineering	08

Unit 2	**2. Software Quality Architecture and Components**
	2.1. The need for comprehensive software quality requirements
	2.2. Classifications of software requirements into software quality factors
	    2.2.1. Product Operation
	    2.2.2. Product Revision
	    2.2.3. Product Transition
	2.3. Parties interested in the definition of quality requirements.
	2.4. SQA architecture
	2.5. Software Quality Components
	    2.5.1. Pre-project components
	    2.5.2. Software project life cycle components
	    2.5.3. Infrastructure components for error prevention and improvement
	2.6. Management SQA components
		10

Unit 3	**3. Project Life Cycle.** 3.1. Classic and other software development methodologies 3.2. Factors affecting intensity of quality assurance activities in the development process 3.3. Verification, validation and qualification 3.4. A model for SQA defect removal effectiveness and cost 3.5. CASE tools in Software Quality 3.5.1. What is a CASE tool?	12

	3.5.2. The contribution of CASE tools to software product quality 3.5.3. The contribution of CASE tools to software maintenance quality 3.5.4. The contribution of CASE tools to improved project management	

Unit 4	**4. Software Quality Infrastructure Components**
	    4.1. Procedures and work instructions –
	        4.1.1. Need
	        4.1.2. Procedures manuals
	        4.1.3. work instruction manuals
	        4.1.4. Procedures and work instructions: preparation, implementation and updating
	    4.2. Supporting Quality devices
	        4.2.1. Templates
	        4.2.2. Checklists
	    4.3. Configuration management -
	        4.3.1. Software configuration, its items and its management
	        4.3.2. Software configuration management – tasks and organization
	        4.3.3. Software change control
	        4.3.4. Release of software configuration versions
	        4.3.5. Provision of SCM information services
	        4.3.6. Software configuration management audits
	        4.3.7. Computerized tools for managing software configuration
		10

Unit 5	**5. Software quality metrics**
	    5.1. Objectives of quality measurement
	    5.2. Classification of software quality metrics
	    5.3. Process metrics
	    5.4. Product metrics
	    5.5. Implementation of software quality metrics
	    5.6. Limitations of software metrics
		10

Unit 6	**6. Software Quality Standards, certification and assessment**
	    6.1. Quality management standards
	        6.1.1. The scope of quality management standards
	        6.1.2. ISO 9001 and ISO 9000-3
	        6.1.3. Certification according to ISO 9000-3
	        6.1.4. Capability Maturity Models – CMM and CMMI assessment methodology
	        6.1.5. The Bootstrap methodology
	        6.1.6. The SPICE project and the ISO/IEC 15504 software process assessment standard
	    6.2. Project process standards
	        6.2.1. Structure and content of IEEE software engineering standards
	        6.2.2. IEEE/EIA Std 12207 – software life cycle processes
	        6.2.3. IEEE Std 1012 – verification and validation
	        6.2.4. IEEE Std 1028 – reviews
		10

Reference Books:

1. Software Quality Assurance by Daniel Galin, Pearson Publication, 2009.
2. Software testing and Quality Assurance Theory and Practice by Kshirasagar Naik and Priyadarshi Tripathy, Wiley Publication.
3. Software Engineering A Practitioner's Approach Sixth Edition by Roger S. Pressman, McGraw Hill Publication
4. Metrics and Models in Software Quality Engineerning, By Stephen H. Kan, Pearson Publication