Course Code	Course Name	Theory	Practical	Tutorial	Theory	Pract/Oral	Tutorial	Total
IoTCSBCDO7012	Software Testing & Quality Assurance (STQA)	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
IoTCSBCDO 7012	Software Testing & Quality Assurance (STQA)	20	20	20	80	--	--	--	100

Course Objectives:

Sr. No.	Course Objectives
The course aims:	
1	To provide students with knowledge in Software Testing techniques.
2	To provide knowledge of Black Box and White Box testing techniques.
3	To provide skills to design test case plans for testing software.
4	To prepare test plans and schedules for testing projects.
5	To understand how testing methods can be used in a specialized environment.
6	To understand how testing methods can be used as an effective tool in providing quality assurance concerning software.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On successful completion, of course, learner/student will be able to:		
1	Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.	L1, L2, L3, L4
2	Understand various software testing methods and strategies.	L1, L2
3	Manage the testing process and testing metrics.	L1, L2, L3, L4
4	Understand fundamental concepts of software automation and use automation tools.	L1, L2
5	Apply the software testing techniques in the real time environment.	L1, L2. L3
6	Use practical knowledge of a variety of ways to test software and quality attributes.	L1, L2. L3

Prerequisite: Programming Language (C++, Java), Software Engineering

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Software Engineering Concepts, Basics of programming Language	**02**	
I	Testing Methodology	Introduction, Goals of Software Testing, Software Testing Definitions, Model for Software Testing, Effective Software Testing vs Exhaustive Software Testing, Software Failure Case Studies, Software Testing Terminology, Software Testing Life Cycle (STLC), Software Testing methodology, Verification and Validation, Verification requirements, Verification of high-level design, Verification of low-level design, validation. **Self-learning Topics:** Study any system/application, find requirement specifications and design the system. Select software testing methodology suitable to the application.	**07**	CO1
II	Testing Techniques	Dynamic Testing: Black Box Testing: Boundary Value Analysis, Equivalence Class Testing, State Table Based testing, Cause-Effect Graphing Based Testing, Error Guessing. White Box Testing Techniques: need, Logic Coverage Criteria, Basis Path Testing, Graph Matrices, Loop Testing, Data Flow testing, Mutation testing. Static Testing. Validation Activities: Unit validation, Integration, Function, System, Acceptance Testing. Regression Testing: Progressive vs. Regressive, Regression Testing, Regression Testability, Objectives of Regression Testing, Regression Testing Types, Define Problem, Regression Testing Techniques. **Self-learning Topics:** Select the test cases (positive and negative scenarios) for the selected system and Design Test cases for the system using any two studied testing techniques.	**09**	CO2
III	Managing the Test Process	Test Management: test organization, structure and of testing group, test planning, detailed test design and test Specification. Software Metrics: need, definition and Classification of software matrices. Testing Metrics for Monitoring and Controlling the Testing Process: attributes and corresponding metrics, estimation model for testing effort, architectural design, information flow matrix used for testing, function point and test point analysis. Efficient Test Suite Management: minimizing the test suite and its benefits, test suite minimization problem, test suite prioritization of its type, techniques and measuring effectiveness. **Self-learning Topics:** Design quality matrix for your selected system	**08**	CO3
IV	Test Automation	Automation and Testing Tools: need, categorization, selection and cost in testing tool, guidelines for testing tools. Study of testing tools: JIRA, Bugzilla, TestDirector and IBM Rational Functional Tester, Selenium etc. **Self-learning Topics:** Write down test cases, execute and manage using studied tools	**05**	CO4

| V | Testing for specialized environment | Agile Testing, Agile Testing Life Cycle, Testing in Scrum phases, Challenges in Agile Testing
Testing Web based Systems: Web based system, web technology evaluation, traditional software and web-based software, challenges in testing for web-based software, testing web-based testing.

Self-learning Topics: Study the recent technical papers on software testing for upcoming technologies (Mobile, Cloud, Blockchain, IoT) | **04** | CO5 |
| VI | Quality Management | Software Quality Management, McCall's quality factors and Criteria, ISO 9000:2000, SIX sigma, Software quality management

Self-learning Topics: Case Studies to Identify Quality Attributed Relationships for different types of Applications (Web based, Mobile based etc.) | **04** | CO6 |

Textbooks:

1. Software Testing Principles and Practices Naresh Chauhan Oxford Higher Education
2. Software Testing and quality assurance theory and practice by Kshirasagar Naik, Priyadarshi Tripathy, Wiley Publication

References Books:

1. Effective Methods for Software Testing, third edition by Willam E. Perry, Wiley Publication
2. Software Testing Concepts and Tools by Nageswara Rao Pustular , Dreamtech press

Online References:
1. www.swayam.gov.in
2. www.coursera.org
3. http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099 -1689
4. https://onlinecourses.nptel.ac.in/noc17_cs32/preview
5. https://www.youtube.com/channel/UC8w8_H_1uDfi2ftQx7a64uQ

Assessment:

Internal Assessment (IA) for 20 marks:

● IA will consist of Two Compulsory Internal Assessment Tests. Approximately 40% to 50% of syllabus content must be covered in First IA Test and remaining 40% to 50% of syllabus content must be covered in Second IA Test

Question paper format

● Question Paper will comprise of a total of **six questions each carrying 20 marks.** Q.1 will be **compulsory** and should **cover maximum contents of the syllabus.**
● **Remaining questions** will be **mixed in nature** (part (a) and part (b) of each question must be from different modules. For example, if Q.2 has part (a) from Module 3 then part (b) must be from any other Module randomly selected from all the modules)
● A total of **four questions** needs to be answered.