

FR. Conceicao Rodrigues College Of Engineering

Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50

Department of Information Technology**B.E. (IT) (semester VII) (2019-2020)****Lesson Plan:****Subject: Software Testing and Quality Assurance (ITDLO7034)****Credits-4**

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical /Oral	Tutorial	Total
ITDLO7034	Software Testing and Quality Assurance	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical & Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITDLO7034	Software Testing and Quality Assurance	20	20	20	80	--	--	--	100

Course Objectives: Students will try to learn:

- 1 Basic software debugging methods.
- 2 White box testing methods and techniques.
- 3 Black Box testing methods and techniques.
- 4 Designing test plans.
- 5 Different testing tools (familiar with open source tools)
- 6 Quality Assurance models.

Course Outcomes: Students will be able to:

1. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
2. Implement various test processes for quality improvement
3. Design test planning.
4. Manage the test process

5. Apply the software testing techniques in commercial environment
6. Use practical knowledge of a variety of ways to test software and an understanding of some of the trade-offs between testing techniques.

Prerequisite: Software Engineering.

Detailed syllabus:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Software Engineering Concepts	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.	09	CO1
II	Testing Techniques	<p>Dynamic Testing: Black Box testing: boundary value analysis, equivalence class testing, state table based testing, cause-effect graphing based testing, error guessing.</p> <p>White box Testing Techniques: need, logic coverage criteria, basis path testing, graph matrices, loop testing, data flow testing, mutation testing. Static Testing.</p> <p>Validation Activities: Unit validation, Integration, Function, System, Acceptance Testing.</p> <p>Regression Testing: Progressive vs. Regressive, regression testing produces quality software, regression testability, objectives of regression testing, regression testing types, define problem, regression testing techniques.</p>	08	CO2 CO3
III	Managing the Test Process	<p>Test Management: test organization, structure and of testing group, test planning, detailed test design and test specification.</p> <p>Software Metrics: need, definition and classification of software matrices.</p> <p>Testing Metrics for Monitoring and Controlling the Testing Process: attributes and corresponding metrics, estimation model for testing effort, architectural design, information flow</p>	08	CO4

		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 its type , techniques and measuring effectiveness.		
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.	09	CO1 CO5
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	08	CO2 CO3
VI	Quality Management	Software Quality Management, McCall's quality factors and Criteria, ISO 9126 quality characteristics, ISO9000:2000, Software quality management	06	CO6

Text Books :

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 :

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

Assessment:

Internal Assessment for 20 marks:

Consisting of **Two Compulsory Class Tests**

Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions, each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus.**
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

2. Course Outcome Statement

Sr.No.	Course Outcome Statement
ITDLO7034.1	Explain software testing methodology and terminology
ITDLO7034.2	Implement various test processes for quality improvement
ITDLO7034.3	Describe different test processes
ITDLO7034.4	Apply software testing techniques in commercial environment
ITDLO7034.5	Describe different quality standards

3.CO-PO and CO-PSO Mapping

Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
ITDLO7034.1	1													2
ITDLO7034.2		2		2										2
ITDLO7034.3	1													2
ITDLO7034.4	2				3									2
ITDLO7034.5	1													2

4. CO Assessment Tools

	Direct Methods				Indirect Methods
					Course Exit Survey
ITDLO7034.1	UT1(70%)	UE(30%)			100%
ITDLO7034.2	UT1(70%)	UE(30%)			100%
ITDLO7034.3	UT2(70%)	UE(30%)			100%
ITDLO7034.4	UT2(70%)	UE(30%)			100%
ITDLO7034.5	UT2(70%)	UE(30%)			100%
ITDLO7034.1	UT2(70%)	UE(30%)			100%

5. Course Outcomes Target:

Upon Completion of this course, students will be able to :

ITDLO7034.1: Explain software testing methodology and terminology [B2:Comprehension]

Target level: 2.0

ITDLO7034.2: Implement various test processes for quality improvement [B3:Application]

Target level: 2.0

ITDLO7034.3: Describe different test processes [B2:Comprehension]

Target level: 2.0

ITDLO7034.4: Apply software testing techniques in commercial environment [B3:Application]

Target level: 2.0

ITDLO7034.5: Describe different quality standards [B2:Comprehension]

Target level: 2.0

7. Lesson Plan

No of classes available:	40	1. No of Classes taken: 2.Total Remedial Lectures		
Sr. No.	Topic Planned with CO	Planned Date	Actual Date	Delivery Mechanisms
	Don't forget to include CO dissemination			
1.	Testing Methodology(ITDLO7034.1)	03-09-19		Blackboard, ppt, notes
2.	Testing Techniques(ITDLO7034.2)	24-07-19		Blackboard, ppt, notes, videos
3.	Managing the Test Process (ITDLO7034.3)	29-08-19		Blackboard, ppt, notes, videos
4.	Test Automation(ITDLO7034.4)	19-09-19		Blackboard, ppt
5.	Testing for specialized environment(ITDLO7034.4)	25-09-19		Blackboard, notes, videos
6.	Quality Management(ITDLO7034.5)	01-10-19		Blackboard, notes, videos

Date wise lecture plan

Date	Topic Taught	Date	Topic Taught
03-09-19	Introduction to Software Testing and COs	04-07-19	Introduction, Goals of software testing
09-07-19	Software testing definitions, Model for software testing	10-07-19	Effective vs. Exhaustive Testing, Software Failure case studies
16-07-19	Software testing terminology, STLC	17-07-19	Software testing methodology, Verification and Validation
18-07-19	Verification requirements, Verification of high level design	19-07-19	Verification of low level design, validation
24-07-19	Dynamic testing: black box testing, Boundry value analysis	25-07-19	Equivalence class testing, state table based testing
30-07-19	Cause-effect graphing based testing, error guessing	31-07-19	White box testing need, logic coverage criteria
01-08-19	Basis path testing, graph metrics	02-08-19	Loop testing, data flow testing
09-08-19	Mutation testing, static testing	20-08-19	Unit validation, integration
21-08-19	Function, system and acceptance testing	22-08-19	Progressive vs. Regressive testing, regression testing produces quality software
27-08-19	Regression testability, objectives of regression testing	28-08-19	Regression testing types, define problem, regression testing techniques
29-08-19	Test organization, structure of testing group, test planning, detailed test design and test specification	30-08-19	Software metrics: need, definition and classification
11-09-19	Attributes and corresponding metrics, estimation model for testing effort, architectural design,	13-09-19	Information flow matrix used for testing, Function point and Test point analysis
17-09-19	Minimizing the test suite and its benefits, test suite minimization problem,	18-09-19	Test suite prioritization and its types, techniques and measuring effectiveness
19-09-19	Automation and testing tools and need, categorization and selection and cost of testing tools	20-09-19	Guidelines for testing tools, Study of tools like JIRA, Bugzilla
24-09-19	TestDirector, Rational Functional Tester, Selenium	25-09-19	Agile Testing life cycle, Testing in scrum phases, Challenges in Agile Testing
26-09-19	Testing web based systems	27-09-19	Testing web based systems
01-10-19	Software Quality Management	03-10-19	McCall's quality factors and Criteria
04-10-19	ISO 9126 standard	09-10-19	ISO 9000:2000
10-10-19	Software Quality Management	11-10-19	Recap