



**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)**

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PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in



COURSE PLAN

Name of the Faculty				
Designation/Department	AP/CSE			
Course Code/Name	P23CSE07- SOFTWARE TESTING AND SOFTWARE QUALITY ASSURANCE			
Year/Department	II-M.E/CSE			
Credits Details	L: 3	T: 0	P: 0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I - INTRODUCTION	No. of Periods: 9
Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester’s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository.	
UNIT II - LEVELS OF TESTING	No. of Periods: 9
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing.	
UNIT III - INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE	No. of Periods: 9
Need for Software quality – Software quality assurance (SQA) – Software quality factors McCall’s quality model – SQA system components – Pre project quality components – Development and quality plans. Procedures and work instructions – Supporting quality devices - Staff training and certification - Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control.	
UNIT IV - SQA COMPONENTS AND PROJECT LIFE CYCLE	No. of Periods: 9
Integrating quality activities in the project life cycle – Reviews – Software Testing – Quality of software maintenance components – Quality assurance for external participants contribution – CASE tools for software quality Management.	

UNIT V - STANDARDS, CERTIFICATIONS & ASSESSMENTS**No. of Periods: 9**

Quality management standards – ISO 9001 and ISO 9000-3 –Capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – Organization of Quality Assurance – Role of management in SQA – SQA units and other actors in SQA system.

TOTAL: 45 PERIODS**Objectives:**

- To learn the criteria for test cases.
- Understand the integration of SQA components into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.
- Be familiar with the Quality standards, certifications and assessments

Text Book:

- T1 – Amazon Web Services for Dummies, Bernard Golden, John Wiley & Sons, 1st Edition, 2013.
- T2 – Programming Windows Azure, Sriram Krishnan, O’Reilly Media, 1st Edition, 2010.
- T3 – Virtualization: A Beginner’s Guide, Danielle Ruest, Nelson Ruest, McGraw-Hill Osborne Media, 1st Edition, 2009.

Reference Book:

- R1- Daniel Galin, “Software Quality Assurance”, Pearson Publication, 3 rd Edition, 2009.
- R2 - Alan C. Gillies, “Software Quality: Theory and Management”, International Thomson Computer Press, 2 nd Edition, 2011.
- R3 - KshirasagarNaim and Priyadarshi Tripathy,” Software Testing and Quality Assurance Theory and Practice”, John Wiley & Sons Inc., 1 st Edition, 2008
- R4 - Mordechai Ben-Menachem, “Software Quality: Producing Practical Consistent Software”, International Thompson Computer Press, 2014

Website:

- W1: StatLect Probability Distributions – <https://www.statlect.com/probability-distributions>
- W2: Khan Academy Statistics and Probability – <https://www.khanacademy.org/math/statistics-probability>
- W3: StatTrek Probability Rules – <https://stattrek.org/probability/probability-rules.aspx>
- W4: GeeksforGeeks Probability in Maths – <https://www.geeksforgeeks.org/probability-in-maths/>

Online Mode of Study:

- W1: NPTEL Probability and Statistics Course – https://onlinecourses.nptel.ac.in/noc24_ma23/preview
- W2: Coursera Probability and Statistics Courses – <https://www.coursera.org/courses?query=probability%20and%20statistics>
- W3: Khan Academy Statistics and Probability – <https://www.khanacademy.org/math/statistics-probability>

- W4: StatTrek Statistics Tutorials – <https://stattrek.org/statistics/tutorials.aspx>
 ➤ W5: StatLect – <https://www.statlect.com/>

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I - INTRODUCTION						
1	Testing as an Engineering Activity	T1	1-5	BB	1	1
2	Testing as a Process	T1	6-10	BB	1	2
3	Testing Maturity Model (TMM)	T1	11-15	BB	1	3
4	Testing Axioms	T1	16-20	BB	1	4
5	Basic Definitions	T1	21-25	BB	1	5
6	Software Testing Principles	T1	26-30	BB	1	6
7	Tester's Role	T1	31-35	BB	1	7
8	Origins of Defects	T1	36-40	BB	1	8
9	Cost of Defects	T1	41-45	BB	1	9
Outcome of Unit I:						
At the end of unit, Students should be able to						
<ul style="list-style-type: none"> Design test cases suitable for a software development for different domains. 						
UNIT II - LEVELS OF TESTING						
10	Need for Levels of Testing	T1	46-50	BB	1	10
11	Unit Testing	T1	51-55	BB	1	11
12	Unit Test Planning	T1	56-60	BB	1	12
13	Designing Unit Tests	T1	61-65	BB	1	13
14	Test Harness	T1	66-70	BB	1	14
15	Running Unit Tests	R1	71-75	BB	1	15
16	Recording Results	T1	76-80	PPT	1	16
17	Specialized Testing	T1	81-85	BB	1	17

18	Quality & Compatibility Testing	T1	86-90	BB	1	18
<ul style="list-style-type: none"> • Outcome of Unit II: At the end of this unit, students should be able to: • Document test plans and test cases designed. 						
UNIT-III - INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE						
19	Need for Software Quality	T1	91-95	BB	1	19
20	Software Quality Assurance (SQA)	T1	96-100	BB	1	20
21	Software Quality Factors	T1	101-105	BB	1	21
22	McCall's Quality Model	T1	106-110	BB	1	22
23	SQA System Components	T1	111-115	BB	1	23
24	Pre-Project Quality Components	T1	116-120	BB	1	24
25	Development & Quality Control)	T1	121-125	BB	1	25
26	Quality Management Practices	T1	126-130	BB	1	26
27	Configuration & Documentation Control	T1	131-135	BB	1	27
<p>Outcome of Unit III: At the end of this unit, students should be able to:</p> <ul style="list-style-type: none"> • Utilize the concepts of SQA in software development life cycle 						
UNIT-IV- SQA COMPONENTS AND PROJECT LIFE CYCLE						
28	Introduction to SQA in Project Life Cycle	T2	136-140	BB	1	28
29	Integrating Quality Activities	T2	141-145	BB	1	29
30	Reviews	T2	146-150	BB	1	30
31	Review Process	T2	151-155	BB	1	31
32	Software testing in SQA					
33	Quality in Maintenance API	T2	161-165	BB	1	33
34	External Participants Contribution	T2	166-170	BB	1	34
35	CASE Tools for SQA	T2	171-175	BB	1	35
36		T2	176-180	BB	1	36

	Advanced CASE Tools Usage)				
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Outcome of Unit IV:

At the end of this unit, students should be able to:

- Apply the concepts in preparing the quality plan & documents

UNIT-V - STANDARDS, CERTIFICATIONS & ASSESSMENTS

37	Quality Management Standards	T2	181-185	BB	1	37
38	ISO 9001 ISO 9001	T2	186-190	BB	1	38
39	ISO 9000-3	T2	191-195	BB	1	39
40	Capability Maturity Model (CMM)	T2	196-200	BB	1	40
41	CMMI & Assessment Methods Applications	T2	201-205	BB	1	41
42	Bootstrap Methodology & SPICE	T2	206-210	BB	1	42
43	SQA Project Process Standards	T2	211-215	BB	1	43
44	Organization of Quality Assurance	T2	216-220	BB	1	44
45	Management Role & SQA Actors	T2	221-225	BB	1	45

Outcome of Unit V:

At the end of this unit, students should be able to:

- **CO5:** Ensure whether the product meets company's quality standards and client's expectations and demands
- **CO6:** Understand the concept of SPICE project

Course Outcome:

At the end of the course the students would be able to

- CO1:** Design test cases suitable for a software development for different domains
- CO2:** Document test plans and test cases designed
- CO3:** Utilize the concepts of SQA in software development life cycle
- CO4:** Apply the concepts in preparing the quality plan & documents.
- CO5:** Ensure whether the product meets company's quality standards and client's expectations and demands
- CO6:** Understand the concept of SPICE project

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO2	3	2	1	1	1	-	-	-	-	1	-	2	2	1
CO3	2	2	1	-	-	-	-	-	-	1	-	-	2	1
CO4	2	2	-	1	-	-	-	-	-	1	-	-	2	1
CO5	2	1	-	-	-	-	-	-	-	1	1	-	2	1
CO6	2	2	1	1	1	-	-	-	2	1	1	2	2	1
AVG	2	2	1	1	1	-	-	-	2	1	1	2	2	1

Internal Evaluation Components:

Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Web portal 1	--	Assessment – I (60)	Unit I and II	CO 1 & CO2
	1	Assignment – Handwritten (20)	1 Explain software testing as an engineering activity and as a process, highlighting the Testing Maturity Model. 2 Explain the role of a tester in a software development organization and describe the basic testing principles.	CO1
	2	Assignment – Poster Presentation / PPT (20)	1 Explain the need for levels of testing and describe unit testing, including unit test planning, design, execution, and test harness usage... 2 Explain alpha and beta testing, testing of OO systems, usability and accessibility testing, configuration and compatibility testing, and website testing....	CO2
Web portal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1 Explain the need for software quality and describe the role of Software Quality Assurance (SQA) in development.	CO3

			2 Discuss software quality factors and explain McCall's quality model with examples..	
	4	Case Study Report (20)	1.Explain the role of external participants in software projects and how SQA ensures quality in their contributions... 2 Explain how quality activities are integrated into the project life cycle, highlighting key reviews and their importance..	CO4
Web portal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)	Phase 2 (Before AT 2)	Phase 3(Before Model Exam)
Assignment 1	Assignment 2	Assignment 3

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1	37	23	-	-	-	-						
AT-2	-	-	37	23	-	-						
MODEL	20	20	20	20	10	10						

Prepared By

Verified By

Approved By