	Course Title: **Software Testing**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CS61T**
	Type of Course: **Lectures, Self Study & Student Activity**	Credit **:04**	Core/ Elective: **Core**
CIE- 25 Marks			SEE- 100 Marks

Prerequisites

Knowledge of Software Engineering

Course Objectives

1. Foundations of software testing, important concepts and the testing process
2. Understand Testing levels and testing methods
3. Study Static testing – how to carry out testing without executing the code
4. Learn about dynamic testing and Test case design techniques. How to do the testing after executing the program and how to design test cases with examples
5. Know the details of Managing the testing Process
6. Know the need for testing tools and how to select a tool.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

	Course outcome	**CL**	**Linked PO**	**Teaching Hours**
CO1	Understand the challenges and problems faced, what is testing, types of testing and the models	*R, U*	**1,2,5,6,7,8,9,10**	**12**
CO2	Understand the different types of testing with their workings.	*U, A*	**1,2,3,4,5,8,9,10**	**08**
CO3	Describe the techniques used in static testing	*U, A*	**1,2,3,4,5,8,9,10**	**10**
CO4	Visualizing the methods used to perform dynamic testing and case studies on it.	*U A*	**1,2,3,4,5,8,9,10**	**08**
CO5	Identify how to manage the testing process by developing the related documents	*U, A*	**1,2,4,5,8,9,10**	**08**
CO6	Analyze why tools are required, how to use them and understand the ethics required.	*U A*	**1,2,4,5,6,7,8,9,10**	**06**
		Total sessions		**52**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Software Testing	3	3	2	3	3	3	3	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If >40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Content and Blue Print of Marks for SEE

Unit No	Unit Name	Hour	Questions to be set for SEE			Marks Weightage	Marks Weightage (%)
			R	U	A	A	
I	Introduction and Fundamentals of Testing	12	5	25	-	30	20.69
II	Testing Levels and Types	08	-	15	10	25	17.24
III	Static Testing Techniques	10	-	25	-	25	17.24
IV	Dynamic Testing and Test case design Techniques	08	-	15	10	25	17.24
V	Managing the Testing Process	08	-	20	5	25	17.24
VI	Software Testing Tools and Code of Ethics for Software Professionals	06	-	10	5	15	10.35
	Total	52	5	110	30	145	100

UNIT I: Introduction and Fundamentals of Testing   12 Hrs

Introduction: Power of software, Challenges in software projects, Software Fiascos, Ariane 5, Patriot Missile, Mars Pathfinder, CT Scanner, The great bank robbery, FBI Virtual case file, Reasons for software failure, What is the solution?, Software Quality Assurance, Software Testing, Code of Ethics, Software Testing Professionals, Skill sets for Testing Professionals, Tasks handled by Testing Professionals

Fundamentals of Testing: What is Testing?, Testing versus Debugging, Testing and Bebugging, Verification and Validation, Root Cause Analysis, Significance of Testing, Cost of Quality, Psychology of Testing, Testing Choices, In-house Testing, Outsourcing, Who does the testing?, Developers as Testers, Independent team Testing, Buddy Testing, Testing Phases, V Model, Testing and Life cycle models, Testing the Systems, Testing the Strategies, Static Testing, Dynamic Testing, Why testing is difficult?, Test Case, Test Oracle, Test Software,

2

Manual versus Automated Testing, Testing Software of different Technologies, Metrics in Testing Phase, When Testing is Complete?, Criteria for Completion of Testing, Risk-based Testing, Types of risks, The Myths and Realities of Testing

UNIT II: Testing Levels and Types   08 Hrs

Testing Levels, Unit/Component Testing, Module Testing, Integration Testing, System Testing, Acceptance Testing, Testing Approaches, Static Testing vs Dynamic Testing, Positive Testing vs Negative Testing, Top-down Testing vs Bottom-up Testing, Functional Testing vs Structural Testing, Mutation Testing, Confirmation Testing, Regression Testing, Types of Testing, Smoke Testing, Black Box Testing, White Box Testing, Interface Testing, Use Case Testing, Gorilla Testing, Alpha Testing, Beta Testing, Field Trail / Operational Testing, Performance Testing / Load Testing, Stress Testing, Accessibility Testing, Conformance Testing, Internationalization Testing, Security Testing, Maintenance Testing, Acceptance Testing, Documentation Testing

UNIT III: Static Testing Techniques   10 Hrs

Static Testing, Advantages of Static Testing, Manual Reviews, Formal Review Process, Informal Reviews, Walkthroughs, Inspections, Making Reviews Successful, Checklists, Formal Code Reviews, Coding Guidelines, Programming style, C Coding Guidelines, Code Optimization, Java Coding Guidelines, Static Analysis using Tools, Tool for Readability Improvement / Indenting, Portability Testing Tool, Symbolic Execution

UNIT IV: Dynamic Testing and Test case design Techniques   08 Hrs

Dynamic Testing, Review work products, Identify Test Objectives, Test Specifications and Test Design, Design Test Cases, Black Box Test Case Design Techniques, White Box Test Case Design Techniques, Experience-based Test Case Design Techniques, Case Study #1 : Test Cases for an IVR System, Case Study #2 : Test Case for Finger Print Recognition System, Document Test Cases, Execute Test Cases, Generate Incident Report / Anomaly Report, Log the Defects, Test Documentation Standards, Formal Methods of Testing

UNIT V: Managing the Testing Process   08 Hrs

Management Commitment, Organization Structure, Testing Process management, Options for Managers, Testing Process Management Activities, Planning, Budgeting and Scheduling the Testing Phase, Test Plan, Alignment of the Process to the Project, Team Formation, Infrastructure, Testing Tools, Reviewing, Monitoring and Risk Management, Risk Management, Test Reports, Metrics, Software Reliability, Defect tracking, Classification of Defects, Configuration Management, Test Closure and Process Improvement, Software testing Maturity Model (SW-TMM), Information Security

UNIT VI: Software Testing Tools and Code of Ethics for Software Professionals   06 Hrs

Software Testing Tools: Need for Tools, Classification of Tools, Functional / Regression Testing Tools, Performance / Load Testing Tools, Testing Process Management Tools,

Benefits of Tools, Risks Associated with the Tools, Does your Organization Need Tools?, Selecting Tools, Introducing the tools in the Testing Process

Code of Ethics for Software Professionals: Human Ethics, Professional Ethics, Ethical Issues in Software Engineering, Code of Ethics and Professional Practice, Software Engineering Code of Ethics and Professional Practice, Ethical issues: Right versus Wrong

📚Text Books

1. ISTQB Certification Study Guide, Dr. K.V.K.K. Prasad, Wiley-Dreamtech Press, ISBN: 9788177227116

References

1. Software Testing Principles and Practices, Srinivasn desikan, Goplaswamy Ramesh, Pearson, ISBN: 9788177581218
2. Software Testing Tools, Dr. K.V.K.K. Prasad, Wiley- Dreamtech Press, ISBN 10: 8177225324
   ISBN 13: 9788177225327
3. Software Testing Concepts and Tools, Nageshwara Rao Pusuluri, DreamTech, ISBN 10: 8177227122   ISBN 13: 9788177227123

Suggested list of student activities

Note: the following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

1.   Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme coordinator.

2**.**   Each student should conduct different activity and no repeating should occur

1	Design test cases on validation of time with a format HH : MM : SS
2	Prepare a report on different types of testing.
3	Prepare a presentation on testing tools available

Course Delivery

The course will be delivered through lectures and Power point presentations/ Video

Course Assessment and Evaluation Scheme

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct As	CIE	IA	Stude	Three IA tests (Average of	20	Blue books	1 to 6

4

Directorate of Technical Education   Karnataka State   CS&E   15CS61T

			three tests will be computed)			
			Student activities	05	Report	1 to 6
			Total	**25**		
	SEE	End Exam	End of the course	100	Answer scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course	Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey		End of the course		Questionnaires	1 to 6 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	%
1	Remembrance	4
2	Understanding	76
3	Application	20

Note to IA verifier: ***The following documents to be verified by CIE verifier at the end of semester***
1. Blue books (20 marks)
2. Student suggested activities report for 5 marks
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks		
Ex: I test/6 th week of sem 10-11 AM	VI SEM			20		
	Year: 2017-18					
Name of Course coordinator : Units:__ CO's:____						
Question no	**Question**			**Marks**	**CL**	**CO**	**PO**
1						

Directorate of Technical Education   **Karnataka State**   **CS&E**   **15CS61T**

2						
3						
4						

Note: Internal choice may be given in each CO at the same cognitive level (CL).

MODEL QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th week of sem 10-11 AM	VI SEM	Software Testing	20
	Year: 2017-18	Course code:**15CS61T**	

Name of Course coordinator :
Units:1,2 Co: 1,2

Note: Answer all questions

Question no	Question	CL	CO	PO
1	Differentiate between debugging and bebugging. (5) OR Explain the challenges faced in software projects.	U	1	1,2
2	Explain the levels of testing and corresponding test plans with a neat diagram. (10)	A	2	1,2, 3
3	Explain the significance of testing (5) OR Explain Test Oracle	U	1	1,2

Format for Student Activity Assessment

DIMENSION	Unsatisfactory 1	Developing 2	Satisfactory 3	Good 4	Exemplary 5	Score
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevant information; concerned to the topic	Collects a great deal of information; all refer to the topic	3

6

Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigned job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	3
					TOTAL	**13/4=3.25=4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned Course Coordinator for assessing the given activity

---

MODEL QUESTION PAPER	Code: **15CS61T**

Diploma in Computer science & Engineering
VI Semester

Course Title: SOFTWARE TESTING

Time: **3 Hours**   Max Marks: **100**

PART-A

Answer any <u>SIX</u> questions. Each carries 5 marks.   **5X6=30 Marks**

1. What is the importance of Gorilla Testing?
2. What are the responsibilities of test manager?
3. Explain the IEEE standard characteristics of an SRS document.
4. Describe the incident report.
5. List the various metrics used in testing phase.

7

6. Mention the benefits of testing tools.
7. What are the tasks handled by testing professionals?
8. Explain Field-trial testing.
9. Explain configuration management.

.

PART-B

Answer any <u>SEVEN</u> full questions each carries 10 marks.   **10X7=70 Marks**

1. Explain V. Model with neat diagram.
2. Differentiate between the following:
     a. Positive and Negative Testing
     b. Alpha and Beta Testing
3. Explain the formal review process.
4. List and briefly explain the steps in dynamic testing
5. Explain the following tools to review testing progress:
     a. Gantt chart
     b. Cost – schedule – milestone chart
6. Explain how tools are introduced in testing process in an organization with help of diagram
7. Explain the classifications of Non-functional requirements.
8.
     a. What criteria are used to declare that the testing is complete?
     b. What is the need for Regression testing?
9. Explain different checklist in Static Testing.
10. What are the various methods used in black box test case design technique?

MODEL QUESTION BANK
Diploma in Computer Science & Engineering
VI Semester
Course Title: Software Testing

CO	Question	CL	Marks
	What are the tasks handled by testing professionals?	R	
	Explain the significance of testing	U	
	Differentiate between debugging and bebugging.	U	
	Differentiate between static and dynamic testing.	U	05
	Discuss important metrics in testing phase.	U	
	What criteria are used to declare that the testing is complete?	R	

I	Explain the challenges faced in software projects.	U		
	Explain V. Model with neat diagram.	A		

	Explain the following:
	    a. Test ORACLE
	    b. Defect seeding
		U	**10**	

	Explain the advantages and disadvantages of in-house testing and outsourcing	U		
	Explain the classifications of Non-functional requirements.	U		
II	Explain Field-trial testing.	U		
	Compare white-box testing and black-box testing.	U		
	Explain the importance of Gorilla Testing.	U		
	Explain the need for Regression testing?	U		
	Compare structural testing at module level and structural testing at system level.	A	**5**	
	Explain stages of testing.	A		
	Describe the different levels of Testing.	U		

	Differentiate between the following:
	    a. Positive and Negative Testing
	    b. Alpha and Beta Testing
		U	**10**	

	Explain how performance and stress testing can be done on database system?	U		
	Explain the levels of testing and corresponding test plans with a neat diagram.	A		
III	Explain the IEEE standard characteristics of an SRS document.	U		
	What factors contribute to the success of review meeting?	U		
	What are the advantages of static testing?	U		
	Discuss the code optimization guidelines during code review.	U	**5**	
	Mention guidelines to be followed by Software Engineers while programming in Java.	U		
	Explain different checklist in Static Testing.	U		
	Explain the formal review process.	U		
	Mention important C coding guidelines	U	**10**	
IV	Describe how to document a test cases.	U		
	Explain how Decision tables are used in black box testing.	U		
	Describe the incident report.	U		
	Write a note on specifications based on testing.	U		
	Explain how to design test case	U	**5**	
	List and briefly explain the steps in dynamic testing.	U		
	Explain boundary value analysis.	U		
	What are the various methods used in black box test case design technique?	A	**10**	
V	Explain configuration management.	A		
	What factors need to be considered while buying COTS software?	U	**5**	
	Explain Defect tracking.	U		
	What are the responsibilities of test manager?	U		
	Explain the content of test report generated after testing phase.	U		
	List the various metrics used in testing phase.	U		
	Explain the following tools to review testing progress: a. Gantt chart	A		

	b. Cost – schedule – milestone chart		**10**
	Explain with a diagram, the change impact analysis in configuration management.	A	
VI	Mention the benefits of testing tools.	U	**5**
	Explain the risk associated with tools	U	
	Write a note on professional ethics	U	
	Explain Performance/Load Testing Tools	U	
	Discuss the code of Ethics framework.	U	
	Explain why testing tools are required	U	
	Explain the different classes of Testing Tools.	U	**10**
	Explain how tools are introduced in testing process in an organization with help of diagram	A	
	Mention the criteria for selecting the tools	U	
	Write a note on software engineering code of ethics.	U	

10