



**PARVATHANENI BRAHMAYYA  
SIDDHARTHA COLLEGE OF ARTS &  
SCIENCE  
Autonomous  
Siddhartha Nagar, Vijayawada-520010  
Re-accredited at 'A+' by the NAAC**

**Offered to: M.Sc. (Computational Data Science)**

<b>Course Name</b>	Software Project Management & Testing			<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS4T1			4	0	0	4	30	70	100
<b>Year of Introduction:</b> Nil	<b>Year of Offering:</b> 2024	<b>Year of Revision:</b> Nil			<b>Percentage of Revision:</b> Nil					
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks										

**Course Description and Purpose:**

Software Project Management and Testing (22DS4T1) is a course that illustrates Software Project Management Concepts, Software Quality Assurance, Estimating Software Projects, Software Testing Strategies, and Software Verification.

**Course Objectives:** The course will help the students to understand, learn various Software Management Techniques, Project Management Strategies, Software Quality Assurance Methods, Estimates of Software Projects, Software Testing Strategies and Methods of Software Verification.

**Course Learning Outcomes:**

Upon successful completion of the course, the student will be able to:

**CO1:** List Software Project Management Concepts, W5HHPPrinciples, SQA Tasks, ISO 9000 Quality Standards,

User Documentation Checklist, Software Testing Strategies.

**CO2:** Explain and Estimate Software Projects, Statistical Software Quality, Software Reliability, Software Safety, Project Management Life Cycle, Management Spectrum

**CO3:** Apply Software Testing Strategies.

**CO4:** Testing Conventional Applications.

**CO5:** Explain Software Project Management Concepts, Software Verifications Methods.

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22DS4T1	CO1			H	M		L	
	CO2	H		M				
	CO3				M			
	CO4		M				L	
	CO5		M					L

**UNIT-I (12 Hours)**

**Introduction to Software Project Management:** Introduction, Why Software Project Management is Important?, What is Project?, Software Projects versus Other Types of Project, Contact Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some ways of Categorizing the Software Projects, Project Charter, Setting Objectives, The Business Case, Project Success and Failure, What is Management, Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices.

**Project Management Concepts:** The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product: Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition, The Project, The W5HH Principles.

### UNIT-II (12 Hours)

**Software Quality Assurance:** Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability : Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan.

**Estimation for Software Projects:** Resources: Human Resources, Reusable Software Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing, Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.

### UNIT-III (12 Hours)

**Software Verification: Verifications Methods:** Peer Reviews, Walkthroughs, Inspections, Applications, Software Requirements Specification (SRS) Document Verification: Nature of the SRS Document, Characteristics and Organization of the SRS Document, SRS Document Checklist, Software Design Description (SDD) Document Verification, Organization of the SDD Document, The SDD Document Checklist, Source Code Reviews: Issues Related to Source Code Reviews, Checklist of Source Code Reviews, User Documentation Verification: Review Process Issues, User Documentation Checklist, Software Project Audit: Relevance Scale, Theory and Practice Scale, Project Audit and Review Checklist

### UNIT-IV (12 Hours)

**Software Testing Strategies:** A Strategic Approach to Software Testing : Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for Web Apps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging: The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error.

### UNIT-V (12 Hours)

**Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing.

Prescribed Text Books			
	Author	Title	Publisher
1	Roger S Pressman	Software Engineering-A Practitioner's Approach	Ninth Edition, McGraw-Hill, A Business Unit of The McGraw-Hill Companies, Inc., 2020.
2	Yogesh Singh	Software Testing	Cambridge University Press, First Edition, 2012

Reference Text Book			
	Author	Title	Publisher
1	Bob Hughes, Mike Cotterell and Rajib Mall	Software Project Management	Mc Graw Hill India, Sixth Edition, November 9, 2017
2	Walker Royce, Barry Boehm	Software Project Management : A Unified Framework	Pearson, 2013, ISBN: 9788177583786



**M.Sc.(Computational Data Science)**

**Semester :IV**

**Course Code: 22DS4T1 Course Name: Software Project Management & Testing**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer the following questions. (5×4=20Marks)**

1. (a) State various phases of Project Management Lifecycle. (CO2, L1)  
(or)

(b) Who is Stackholder? Explain role of Stackholder. (CO2, L1)

2. (a) State some elements of Software Quality. (CO1, L1)  
(or)

(b) State LOC-BasedEstimation with example. (CO2,L1)

3. (a) Explain verification method Walkthroughs. (CO3,L2)  
(or)

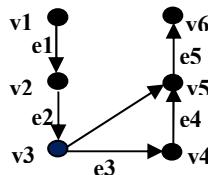
(b) Explain various issues related to Source Code Reviews. (CO3,L2)

4. (a) What is the difference between Verification & Validation in Software Testing? (CO3,L1)  
(or)

(b) What is Alpha and Beta Testing. (CO4,L1)

5. (a) Write any four Test Characteristics. (CO4,L1)  
(or)

(b) Draw the Graph Matrix for the following Graph. (CO4,L1)



**SECTION-B**

**Answer the following questions. (5×10=50Marks)**

6. (a) Explain various activities covered in Software Development Life Cycle. (CO1,L2)  
(or)

(b) Explain Management Spectrum in detail.(CO2,L2)

7. (a) Examine Software Reliability in detail (CO2, L4)  
(or)

(b) Examine (i)TheCOCOMOIIModel (ii)TheSoftwareEquationof EmpiricalEstimationModels (CO2,L4)

8. (a) Develop procedure for Software Requirements Specification (SRS) Document Verification. (CO3,L3)  
(or)

(b) Develop procedure for User Documentation Verification. (CO5,L3)

9. (a) Explain various strategies to test Conventional Software. (CO4, L5)  
(or)

(b) Explain various strategies to test Object-Oriented Software. (CO3, L5)

10. (a) Explain White-Box Testing in detail. (CO3,L5)  
(or)

(b) Explain Black-Box Testing in detail. (CO3,L5)

