SOFTWARE RELIABILITY TECHNIQUES

(Program Elective – VI)

Course Code	19IT4801D	**Year**	IV	**Semester**	II
Course Category	PE	**Branch**	IT	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	SE
Continuous Internal Evaluation :	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes		**Blooms Taxonomy Level**
Upon successful completion of the course, the student will be able to		
CO1	Understand reliable software systems.	**L2**
CO2	Apply the fault handling and failure forecasting techniques in software systems	**L3**
CO3	Apply different time dependent and time independent software reliability models	**L3**
CO4	Examine reliability models for software systems.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3		3	3									2	
CO2	3		3	3									2	
CO3	3		3	3									2	
CO4	3		3	3									2	

Syllabus		
Unit No	**Contents**	**Mapped CO**
I	**Introduction**: The need for Reliable Software, Software Reliability Engineering concepts, Basic Definitions, Technical terms: Fault Prevention, Fault Removal, Fault Tolerance, Fault/Failure Forecasting, The Software Reliability Engineering Process, Software Reliability and Hardware Reliability.	**CO1, CO2**
II	**Software Reliability and System Reliability:** Dependability Concept, Failure behavior of X-ware System, Failure behavior of X-ware System with Service Restoration **Developing Operational Profiles:** Concepts, Development Procedure, Test Selection.	**CO1, CO2**
III	**Software Reliability Modeling Survey:** Introduction, Historical Perspective and Implementation, Exponential Failure Time Class of Models: Non Homogeneous Poisson Process, Musa's Basic execution time model, Weibull and Gamma Failure Time Class of Models: Weibull model, Infinite Failure Category Models: Duane' s Model, Model Relationships, Software Reliability Prediction in Early Phases of the Life Cycle	**CO1, CO3**
IV	**Software Metrics for Reliability Assessment:** Introduction, Static Program Complexity, Dynamic Program Complexity, Software Complexity and Software Quality, Software Reliability Modeling.	**CO1, CO4**
V	**Software Testing and Reliability:** Introduction,, Overview of Software Testing, Operational Profiles, Time/Structure-Based Software Reliability Estimation.	**CO1, CO4**

Learning Resources
Text books
1. J.D. Musa, *Software Reliability Engineering*, McGraw Hill, New York , 2004 2. H. Pham, *Software Reliability*, Springer Verlag, New York , 2000
References
1. Patric D. T.O Connor, *Practical Reliability Engineering, 4th Edition*, John Wesley & Sons, 2003 2. D. Reled, *Software Reliability Methods*, Springer Verlag, New York , 2001
e-Resources and other Digital Material
https://users.ece.cmu.edu/~koopman/des_s99/sw_reliability/