Department of Engineering Mathematics & Computing

Faculty Details

Name of the Faculty: Dr. V. P. Shinde
Designation: Professor
Department: Engineering Mathematics & Computing

Course Details

Name of the Program: B. Tech. in Mathematics & Computing, July-Dec. 2024
Branch: Mathematics & Computing
Semester: Fourth Year (Seventh Semester)
Title of the Subject: Engineering Reliability **Subject Code**: 250731
Number of Students: 32

LECTURE PLAN

Name of Course with Code: Engineering Reliability (250731)

Class: Final Year 1st Sem (MAC) Session:July-December2024

Session	Date	Content to be covered	COs	BL	% Coverage
1.		Introduction to reliability, define failure/ hazard rate	CO1	1,2	1.5
2.		Network modelling and reliability evaluation basic concepts	CO1	2,3	1.5
3.		Evaluation of network liability systems	CO1	3,4	2.0
4.		Parallel systems, series parallel systems	CO1	3,4	2.5
5.		Partially redundant systems	CO1	2,3	2.6
6.		Types of redundancies, k- out- of- m systems	CO1	3,4	2.5
7.		evaluation of network reliability using conditional probability method	CO1	2,3	2.6
8.		Paths based and cut set based approach,	CO1	3	2.4
9.		Complete event tree and reduced event tree methods	CO1	3,4	2.7
10.		Time dependent probability basic concepts	CO2	1,2	2.5
11.		Bath tubs curve	CO2	2,3	2.5
12.		Reliability functions f(t), F(t), R(t), h(t) relationship between this functions	CO2	3,4	2.6
13.		Exponential distribution expected value and standard deviation of distribution	CO2	3,4	2.6
14.		Gama failure density and distribution functions expected value and standard deviation of distribution	CO2	3,4	2.5
15.		Weibull's failure density and distribution functions expected value and standard deviation of distribution	CO2	4,5	2.6
16.		Rayleigh's failure density and distribution functions expected value and standard deviation of distribution	CO2	4,5	2.6
17.		Measures of reliability MTTF, MTTR and MTBF	CO2	2,3	2.6

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18.		for series and parallel systems	CO2	2,3	2.7
19.		Discrete Markov chains	CO3	2	2.5
20.		continuous Markov processes	CO3	2	2.6
21.		Basic concepts of stochastic transitional probability Matrix	CO3	2,3	2.7
22.		Time dependent probability evaluation, limiting state probability evaluation	CO3	3	2.8
23.		Markov processes- modelling	CO3	2,3	2.8
24.		concepts state space diagrams for evaluation of probability matrix	CO3	3,4	2.7
25.		Time dependent reliability evaluation of single component repairable model evaluation of limiting state	CO3	2,3	2.6
26.		Probability of one & two component repairable models	CO3	4,5	2.5
27.		Concept of maintainability, availability,	CO4	1,2	2.5
28.		Availability function Type of system availability	CO4	2,3	2.6
29.		Economies of reliability engineering	CO4	2,3	2.4
30.		Replacement of items, standby system maintenance costing	CO4	2,3	2.4
31.		Budgeting preventive maintenance	CO4	3,4	2.7
32.		Software reliability growth model	CO5	3,4	2.5
33.		Classification of Software Reliability Models Analytical Model	CO5	2,3	2.6
34.		Dynamic or Probabilistic Model	CO5	2	2.4
35.		Discrete Time Models and	CO5	3	2.5
36.		Continuous Time Models and their testing	CO5	3	2.6

BLOOMS LEVEL

1. REMEMBER, 2. UNDERSTAND, 3. APPLY, 4. ANALYSE, 5. EVALUATE, 6. CREATE

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Modes of Teaching Subject: Engineering Reliability (250731)

UNIT	CONTENT	MODE
Unit-1	Introduction to reliability, define failure/ hazard rate	Offline/Black Board Teaching
	Network modelling and reliability evaluation basic concepts	Offline/Black Board Teaching
	Evaluation of network liability systems, parallel systems, series parallel systems	Learning through Demonstration
	Partially redundant systems, k- out- of- m systems	Offline/Black Board Teaching
	Types of redundancies, evaluation of network reliability using conditional probability method	Offline/Black Board Teaching
	Paths based and cut set based approach, complete event tree and reduced event tree methods	Offline/Black Board Teaching
Unit-2	Time dependent probability basic concepts, Bath tubs curve,	Learning through demonstration
	Reliability functions f(t), F(t), R(t), h(t) relationship between this functions	Learning through experimentation
	Exponential, Gama failure density and distribution functions expected value and standard deviation of distribution	Offline/Black Board Teaching
	Weibull's and Rayleigh's failure density and distribution functions expected value and standard deviation of distribution	Offline/Black Board Teaching
	Measures of reliability MTTF and MTTR MTBF, MTTF for series and parallel systems	Learning through demonstration
Unit-3	Discrete Markov chains and continuous Markov processes	Offline/Black Board Teaching
	Basic concepts of stochastic transitional probability Matrix	Offline/Black Board Teaching
	Time dependent probability evaluation, limiting state probability evaluation	Offline/Black Board Teaching
	Markov processes- modelling concepts state space diagrams	Learning through demonstration
	Time dependent reliability evaluation of single component repairable model evaluation of limiting state	Offline/Black Board Teaching
	Probability of one & two component repairable models	Offline/Black Board Teaching
Unit-4	Concept of maintainability, availability, availability function	Offline/Black Board Teaching
	Type of system availability, economies of reliability engineering	Offline/Black Board Teaching
	Replacement of items, standby system maintenance costing	Offline/Black Board Teaching
	Budgeting preventive maintenance	Offline/Black Board Teaching

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Unit-5	Software reliability growth model	Learning through projects
	Classification of Software Reliability Models Analytical Model	Offline/Black Board Teaching
	Dynamic or Probabilistic Model	Offline/Black Board Teaching
	Discrete Time Models and Continuous Time Models and their testing	Offline/Black Board Teaching

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
-	76.00%	-	16.00%	4.00%	4.00%	-	-

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Faculty Details

Name of the Faculty: Utkarsh Sharma
Designation: Assistant Professor
Department: Computer Science and Business Systems

Course Details

Name of the Program: B. Tech. in Mathematics & Computing, July-Dec. 2024
Branch: Mathematics & Computing
Semester: Fourth Year (Seventh Semester)
Title of the Subject: Distributed Computing **Subject Code**: 250732
Number of Students: 34

Guidelines to study the subject:

1. Basic networking concepts
2. Basic operating system concepts
3. Data Structures and Algorithms

Recommended Books:

R1. Distributed Operating System, Andrew S. Tanenbaum.
R2. Distributed System Concepts and Design, Coulouris & Dollimore.
R3: Distributed Operating System Concept & Design, Sinha, PHI.

LECTURE PLAN (250732)

S. No.	Content to be covered	COs	Blooms Level (BL)	% coverage	Book(s) followed
	Unit 1				
1	Introduction to Distributed Systems	1	1	2.94%	R1
2	Goals of Distributed System	1	1	2.94%	R1
3	Advantages & Disadvantage of Distributed System	1	1	2.94%	R1
4	Hardware and Software Concepts	1	2	2.94%	R1
5	Distributed Computing Model	1	1,2,3	2.94%	R1
6	Issues in Designing Distributed System	1	2,3,4	3.57%	R1
	Unit 2				
7	Basic Concept of Distributed Share Memory	2	1	2.94%	R1
8	DSM Architecture	2	1,2,3	2.94%	R1
9	Types of Distributed Share Memory	2	1	2.94%	R1
10	Design & Implementations Issues in DSM System	2	2,3,4	2.94%	R1
11	Structure of Share Memory Space	2	2,3	2.94%	R1
12	Consistency Model and Thrashing	2	1,2,3	2.94%	R1
	Unit 3				
13	Desirable Features of Good Distributed File System	3	1	2.94%	R2, R3
14	File Model, File Service Architecture	3	1,2	2.94%	R2, R3
15	File Accessing Model	3	1,2	2.94%	R2, R3
16	File Sharing Semantics	3	2,3,4	2.94%	R2, R3
17	File Catching Scheme	3	1,2	2.94%	R2,R3
18	File Application	3	2,3,4	2.94%	R2, R3

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19	Fault Tolerance	3	1,2	2.94%	R1, R2
	Unit 4				
20	Inter Process Communication and Synchronization	4	1,2	2.94%	R2, R3
21	Group Communication	4	1,2	2.94%	R2, R3
22	Client Server Communication	4	1,2	2.94%	R2, R3
23	RPC Implementing, RPC Mechanism, RPC Messages	4	1,2,3	2.94%	R2, R3
24	Clock Synchronization, Mutual Exclusion	4	2,3	2.94%	R2, R3
25	Election Algorithms - Bully & Ring Algorithms	4	1,2,3,4	2.94%	R2, R3
	Unit 5				
26	Distributed Scheduling	5	1,2,3	2.94%	R1, R3
27	Deadlock Distributed Scheduling	5	2,3	2.94	R1,R3
28	Components for Load Distributing Algorithms	5	1,2	2.94%	R1, R3
29	Different Types of Loads Distributing Algorithms	5	2,3	2.94%	R1, R3
30	Task Migration and its issues	5	1,2	2.94%	R1, R3
31	Issues in deadlock detection & Resolutions	5	1,2,3	2.94%	R1,R3
32	Deadlock Handling Strategy	5	1,2,3	2.94%	R1, R3
33	Distributed Deadlock Algorithms	5	2,3,4	2.94%	R1,R3
34	Case Study of Distributed System: Amoeba, Mach, Chorus.	5	2,3,4	2.94%	R1, R3

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Modes of Teaching

Subject: Distributed Computing (250732) - Seventh Semester
Name of the Program: B.Tech. in Mathematics & Computing, **July-Dec. 2024**

UNIT	CONTENT	MODE
Unit-1	Introduction to Distributed Systems	Offline / Black Board Teaching
	Goals of Distributed System	Offline & Open discussions
	Advantages & Disadvantage of Distributed System	Offline / Black Board Teaching
	Hardware and Software Concepts	Offline & activity based learning
	Distributed Computing Model	Offline / Black Board Teaching
	Issues in Designing Distributed System	Offline / Black Board Teaching
Unit-2	Basic Concept of Distributed Share Memory	Offline / Black Board Teaching
	DSM Architecture	Teaching through video lecture
	Types of Distributed System	Offline / Black Board Teaching
	Design & Implementations Issues in DSM System	Offline / Black Board Teaching
	Structure of Share Memory Space	Offline & project based learning
	Consistency Model and Thrashing	Offline & activity based learning
Unit-3	Desirable Features of Good Distributed File System	Offline / Black Board Teaching
	File Model, File Service Architecture	Offline & activity based learning
	File Accessing Model	Offline / Black Board Teaching
	File Sharing Semantics	Group based Learning
	File Catching Scheme	Teaching through demonstration
	File Application & Fault Tolerance	Teaching through demonstration by students
Unit-4	Inter Process Communication and Synchronization	Offline & activity based learning
	Group Communication	Offline / Black Board Teaching
	Client Server Communication	Learning through demonstration
	RPC Implementing, RPC Mechanism, RPC Messages	Offline / Black Board Teaching
	Clock Synchronization, Mutual Exclusion	Group based Learning
	Network flows, and cut sets	Activity based Learning
	Properties of cut set, and some theorems	Offline / Black Board Teaching
	Fundamental circuits and cut sets	Teaching through demonstration
	Distributed Scheduling	Offline / Black Board Teaching

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Unit-5	Deadlock Distributed Scheduling	Teaching through demonstration
	Components for Load Distributing Algorithms	Group based Learning
	Different Types of Loads Distributing Algorithms	Offline / Black Board Teaching
	Task Migration and its issues	Offline & activity based learning
	Issues in deadlock detection & Resolutions	Teaching through video lecture
	Deadlock Handling Strategy, Distributed Deadlock Algorithms	Offline / Black Board Teaching
	Case Study of Distributed System: Amoeba, Mach, Chorus.	Offline / Black Board Teaching

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
5.88%	47.05%	11.76%	8.82%	8.82%	-	17.64%	-