MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA

Deemed to be University

(Declared under Distinct Category by Ministry of Education, Government of India)

NAAC ACCREDITED WITH A++ GRADE

B.Tech. Offered by Department of Engineering Mathematics & Computing

Annexure-I

VIISemester *for batches admitted in academic session 2021-22*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Online, Offline, Blended)	$$Mode of Exam.
				Theory Slot				Practical Slot			MOOCs								
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation		Assignment	Exam		L	T	P			
				End Sem. Exam.	$Proficiency in subject /course	Mid Sem. Exam	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project									
1.	2507XX	DE	Departmental Elective* (DE-II)	50	10	20	20	-	-	-	-	-	100	3	-	-	3	Offline	PP
2.	2507XX	DE	Departmental Elective* (DE-III)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ
3.	2507XX	DE	Departmental Elective* (DE-IV)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ
4.	910XXX	OC	Open Category (OC-2)	50	10	20	20	-	-	-	-	-	100	3	-	-	3	Offline	PP
5.	250704	DLC	Departmental Lab	-	-	-	-	60	20	20	-	-	100	-	-	4	2	Offline	SO
6.	250705	DLC	Creative Problem Solving (Evaluation)	-	-	-	-	25	25	-	-	-	50	-	-	2	1	Blended	SO
7.	250706	DLC	Summer Internship Project-III (04 weeks) (Evaluation)	-	-	-	-	60	-	-	-	-	60	-	-	4	2	Offline	SO
Total				**100**	**20**	**40**	**40**	**145**	**45**	**20**	**50**	**150**	**610**	**12**	**-**	**10**	**17**	**-**	**-**
8	**1000008**	**MAC**	Universal Human Values & Professional Ethics(UHVPE)	50	10	20	20	-	-	-	-	-	100	2	-	-	GRADE	Blended	MCQ
Additional Course for Honours or minor Specialization				**Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization**															

$ **proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.**

$$**MCQ:** Multiple Choice Question $$**AO:** Assignment + Oral $$**PP:** Pen Paper $$**SO:** Submission + Oral

* **Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform with Credit Transfer**

Mode of Teaching						Mode of Examination					Total Credits
Theory				Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended		Offline	Interactive	PP	A+O	MCQ	SO	SO	
		Offline	Online								
5	2	-	-			2		2	3		17
71.42%	28.57%	-	-			28.57%		28.57%	42.85%		

List of Departmental Electives (DE) Course

	S. No.	Subject Name	Week	Name of Mentors
DE-3 (VII SEM)	1	Ethical Hacking	12	Prof.IndranilSengupta from IIT Kharagpur
	2	Computational Complexity	12	Prof.SubrahmanyamKalyanasundaram from IIT Hyderabad
	3	Approximation Algorithm	12	Prof.Palash Day from IIT Kharagpur
DE-4 (VII SEM)	1	Deep Learning	12	Prof. SudarshanIyengar from IIT Ropar
	2	Digital Image Processing	12	Prof. Prabir Kumar Biswash from IIT Kharagpu
	3	Advance Distributed System	12	Prof.SmrutiRanjan Sarangi, form IIT Delhi

Annexure-III

B. Tech. (Seventh Semester)
Engineering Reliability
(DE –II) MAC -250731

L	T	P	C
3	0	NIL	3

Course Objectives:

- To understand the concept of Reliability.
- To evaluate measures of reliability
- To determine the maintainability and availability
- To explore Software reliability growth model

Unit-I

Introduction to reliability, define failure/ hazard rate, network modelling and reliability evaluation basic concepts, evaluation of network liability systems, parallel systems, series parallel systems, partially redundant systems, k- out- of-m systems, types of redundancies, evaluation of network reliability using conditional probability method, paths based and cut set based approach, complete event tree and reduced event tree methods.

Unit-II

Time dependent probability basic concepts, reliability functions f(t), F(t), R(t), h(t) relationship between this functions bath tubs curve, exponential, Gama Weibull's and Rayleigh's failure density and distribution functions expected value and standard deviation of distribution, measures of reliability MTTF and MTTR,MTBF, MTTF for series and parallel systems

Unit-III

Discrete Markov chains and continuous Markov processes, basic concepts of stochastic transitional probability Matrix, time dependent probability evaluation, limiting state probability evaluation, Markov processes- modelling concepts state space diagrams, time dependent reliability evaluation of single component repairable model evaluation of limiting state, probability of one&two component repairable models.

Unit - IV

Concept of maintainability, availability, availability function, type of system availability, economies of reliability engineering, replacement of items, standby system maintenance costing and budgeting preventive maintenance.

Unit - V

Software reliability growth model, Classification of Software Reliability Models, Analytical Model, Dynamic or Probabilistic Model- Discrete Time Models and Continuous Time Models and their testing.

Course Outcomes

After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Determine the reliability of system
CO2	Evaluation of measure for system reliability
CO3	Apply Markov process to carried out system reliability
CO4	Acquire the knowledge of maintainability and availability of system
CO5	Describe Software reliability growth model

Text Books:

1. Mathematical Statistics by C.E.Weatherbum.
2. Fundamentals of Mathematical Statistics by S C Gupta and V K Kapoor- S.Chand& Sons, New Delhi.
3. Fundamentals of Applied Statistics by S C Gupta and V K Kapoor, S Chand & Sons, New Delhi.

Reference Books:

1. An outline of Statistical Theory by Goon, Gupta and Dasgupta.
2. Fundamentals of Statistics by Goon, Gupta and Dasgupta

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

B. Tech. (Seventh Semester)

Distributed Computing
(DE- II) MAC-250732

L	T	P	C
3	0	NIL	3

COURSE OBJECTIVES

- To provide students contemporary knowledge of distributed systems.
- To equip students with skills to analyze and design distributed applications.
- To gain experience in the design and testing of a large software system, and to be able to communicate that design to others.

Unit - I

Introduction to Distributed Systems: Architecture for Distributed System, Goals of Distributed System, Hardware and Software Concepts, Distributed Computing Model, Advantages & Disadvantage Distributed System, Issues in Designing Distributed System.

Unit -II

Distributed Share Memory: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & Its Types, Design & Implementations Issues in DSM System, Structure of Share Memory Space, Consistency Model and Thrashing.

Unit - III

Distributed File System: Desirable Features of Good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault Tolerance.

Unit - IV

Inter Process Communication and Synchronization: Data Representation & Marshaling, Group Communication,

Client Server Communication, RPC Implementing, RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms - Bully & Ring Algorithms.

Unit - V

Distributed Scheduling and Deadlock Distributed Scheduling- Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Loads Distributing Algorithms, Task Migration and its issues. Deadlock- Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms. Case Study of Distributed System: Amoeba, Mach, Chorus.

COURSE OUTCOMES After completion of this course, the students would be able to:

CO's	Description of CO's
CO1	Tell the basic elements and concepts related to distributed system technologies
CO2	Demonstrate knowledge of the core architectural aspects of distributed systems
CO3	Identify how the resources in a distributed system are managed by algorithm
CO4	Examine the concept of distributed file system and distributed shared memory
CO5	Compare various distributed system algorithms for solving real world problems

RECOMMENDED BOOKS:

1. Distributed Operating System Concept & Design, Sinha, PHI
2. Distributed System Concepts and Design, Coulouris&Dollimore, Pearson Publication
3. Distributed Operating System, Andrew S. Tanenbaum, Pearson.

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially

B. Tech. (Seventh Semester) **Annexure-IV**

Discrete Structure

(OC-II) MAC- 910213

L	T	P	C
3	0	0	3

Objective of Course

- To have knowledge of basic algebra and discrete numeric function.
- To describe function and its relation
- To familiarize propositional logic
- To know about the graph theory and its application in computer
- To familiarize the discrete numeric function and generating function

UNIT 1:

Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan's law Cartesian products, Relations, relational matrices, properties of relations, equivalence relation, functions, Injection, Surjection and Bijective mapping, Composition of functions, Permutations, the characteristic functions and Mathematical induction.

UNIT 2:

Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity, distributive inequality, Lattice homomorphism, lattice isomorphism, completelattice, complemented lattice distribution lattice.

UNIT 3:

Group axioms, permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem, fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications.

UNIT 4:

Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths and circuits, Eulerian and Hamiltonian graphs. Trees: properties of trees, pendant vertices in tree, Center of tree, spanning trees and cut vertices, binary tree, matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.

UNIT 5:

Introduction to discrete numeric functions and generating functions, introduction to recurrence relations and recursive algorithms, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions

Course Outcomes

After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Acquire Knowledge of set theory
CO2	Analyze the concept of Lattices
CO3	Identify the concept of Group Theory
CO4	Derive the Inferences from Graph theory
CO5	Illustrate the Discrete numeric function and recursive relation

Recommended Books:

1. J.P Tremblay and Manohar: Discrete Mathematical Structures with Application to Computer science, McGraw-Hill, 1st Edition 2017.
2. NarsinghDeo: Graph Theory, PHI Learning, 2014.
3. C.L Liu: Discrete Mathematics.4th Edition 2012.
4. Rosen: Discrete Mathematics and its Applications, McGraw Higher Ed, 7th Edition 2008.
5. N. Herstein: Topics in Algebra, Wiley, 2nd Edition 2006.

Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 – Substantially