S.	Course Name	Course	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No		outcome														۱	1	
		No.														۱	1	
1	(CS251) Data	CS251.1	CO1: Represent and organize data using different data structures.	2	1	2	1	1	-	-	1	1	2	-	-	1	2	-
	Structure	CS251.2	CO2: Design algorithms to create and manipulate data structures.	2	2	3	3	2	-	-	1	1	1	-	-	2	3	1
	(B.Tech.	CS251.3	CO3: Estimate and compare the performance of various operations performed on the data structures.	3	2	2	2	1	-	-	1	1	2	-	1	2	3	2
	Semester-3)	CS251.4	CO4: Employ various sorting techniques to sort the data.	2	2	3	3	3	-	-	1	1	2	2	1	1	3	-
		CS251.5	CO5: Illustrate the usage of hashing functions and collision resolution techniques.	2	1	2	1	3	-	-	2	1	2	2	2	1	2	2
2	(CS262)	CS262.1	CO1: Design efficient algorithms for real-life problems, using the techniques learned as building block and	3	2	2	1	2	1	1	1	-	2	-	2	1	-	1
	Algorithm		identify the limitations in algorithm design for solving it.													۱	1	
	Design &	CS262.2	CO2: Argue and justify the correctness of algorithm design and analyze the running time of algorithms using	-	2	1	2	2	1	1	1	-	1	-	1	ı - '	1	2
	Analysis		asymptotic analysis.													I		
	(B.Tech.	CS262.3	CO3: Describe different paradigms of algorithm design, such as Divide & Conquer, Greedy, Dynamic	2	2	-	-	2	-	2	1	-	-	-	-	1	1	-
	Semester-4)		Programming, etc, and predict which algorithmic design situation calls for it.													۱ <u> </u>		
		CS262.4	CO4: Compare the notion of tractable and intractable problems and develop algorithms for computationally	3	1	2	2	1	-	-	1	-	-	-	-	2	-	2
			intractable problems.													ı!	1	
		CS262.5	CO5: Solve the inter-disciplinary real-world problems including sorting problems, trees and graphs problems,	1	2	-	1	1	1	-	1	-	-	-	-	1	3	1
			and recurrence relations.													ı!	1	
3	(MA101)	MA101.1	CO1: Interpret the sequences and various types of series and their convergence, Taylor's series and arc length.	2	1	2	-	1	-	-	-	1	1	-	1	1	2	1
	Mathematics -	MA101.2	CO2: Illustrate the functions of more than one independent variable and calculate partial derivatives along with	2	1	2	-	1	1	-	2	1	1	1	-	2	2	2
	I (B.Tech.		their applications.													ı!	1	
	Semester-1)	MA101.3	CO3: Explore and find the extreme values of functions and integrate a continuous function of two or three	2	1	3	1	-	1	2	3	1	1	2	1	1	3	2
			variables over a bounded region.													ı!	1	
		MA101.4	CO4: Analyze the physical interpretation of Curl, divergence, directional derivatives and gradient with their	2	2	1	-	1	-	-	1	1	1	1	1	1	2	2
			applications.													ļ	<u> </u>	
		MA101.5	CO5: Determine line integral, surface integral and volume integral and correlate them with the application of	2	2	1	1	1	2	-	1	1	1	-	-	3	2	2
			Stokes, Green and Divergence theorem.													ا	Ļ	
4	(MA102)	MA102.1	CO1: Represent matrices, determinants, and techniques for solving systems of linear equations in the different	3	1	2	-	1	-	-	1	1	1	1	1	3	2	2
	Mathematics -		areas of Linear Algebra, Describe Vector Space and its linear Independence. Solve Eigenvalue problems and													۱	1	
	II (B.Tech.		apply Cayley Hamilton Theorem.													ļ!		
	Semester-2)	MA102.2	CO2: Explain the concept of differential equations and evaluate various methods to solve ordinary differential	2	2	2	-	1	1	2	2	-	3	1	-	2	2	1
			equations.													ب ا		
		MA102.3	CO3: Extend the concept of series solutions to solve differential equations and check orthogonality for a given	1	1	2	1	1	1	2	3	1	1	2	1	3	1	1
			tunctions.	-	-								_			<u> </u>		-
		MA102.4	CO4: Implement the integral transformation using the concept of Laplace transformation and apply it to solve	2	2	1	-	-	-	-	1	1	2	1	1	2	3	2
			differential equations.		-			-	-	-								-
-	(140204)	MA102.5	CO3: Solve initial and boundary values problems using Fourier series and Fourier transformations.	3	2	1	1	1	2	2	1	1	1	1	-	2	1	3
5	(IVICZUI)	MC201.1	COL: Employ logical skills developed in this course, in various computer applications.	3	1	1	-	1	-	-	1	-	-	-	-			1
	Mathematics	MC201.2	CO2: Identify various algebraic structures that can be used in different branches of engineering and sciences.	2	1	-	-	1	-	-	1	-	-	-	1		1	1
	(B Toch	MC201.3	CO3: Formulate, model and analyse the real-world problems in graph theoretical terms.	2	2	1	-	1	-	-	-	1	2	-	-		1	1
	(D. recn. Semester-3)	MC201.4	CO4: Apply the computing skills to formulate, solve and analyse interdisciplinary real-world problems for higher	2	2	2	-	1	-	-	1	-	-	-	1	1	_ Z	1
6	(MC202) Deal	N46202.4	study and research.	2		2	2		2		2			2	2		-	2
6	(IVIC202) Real	MC202.1	COL: Describe the basic concepts of Real Numbers system, sets and bounds.	2	1	2	3	1	2	1	2	-	1	3	2	3	2	3
	Analysis (B.Toch	IVIC202.2	CO2: Describe the concepts of related to Sequence and its Convergence, Boizano Weierstrass Theorem.	3	2	2	3	1	1	1	2	-	2	3	3	3	3	3
	Semester-4)	IVIC202.3	CO3: Demonstrate the understanding of generalization of real numbers concepts.	3	2	2	1	1	1	1	-	-	-	2	1	3	1	2
	Jenies(er-4)	IVIC202.4	CO4: Analyze the concepts of Cauchy Sequence and continuity of sets and function.	2	2	3	2	1	1	1	-	-	-	2	2	3	2	2
		MC202.5	CO5: Provide analytical proof of integration and integrate discontinuous function through Riemann integral and	3	3	2	2	1	1	-	-	-	1	1	1	3	1	2
		M6202.6	then describe the relationship between integration and differentiation.			-	-	-		-	4			-				
		IVIC202.6	Cob: Demonstrate the understanding of sets of measure zero, sums, integrals.	1	1	2	T	T	T	T	T	-	T	2	T	5	1	1
																, [,]	i	

7	(MC203)	MC203.1	CO1: Differentiate between proper and improper integrals.	3	2	1	1	-	-	-	1	-	-	-	2	2	1	-
	Mathematics-	MC203.2	CO2: Determine convergence of improper integrals with discontinuities in their domain or infinite limits of	3	1	1	2	-	-	-	1	-	-	-	2	2	2	-
	III (B.Tech.		integration.															
	Semester-3)	MC203.3	CO3: Differentiate a differentiable complex function and apply various transformations like bilinear transforms	3	1	1	1	-	-	-	1	-	-	-	2	2	2	1
			and Schwarz-Christoffel transformation and express complex-differentiable functions as power series.															
		MC203.4	CO4: Estimate parametrisation of curves, compute complex line integrals.	3	2	1	1	-	-	-	1	-	-	-	2	2	1	-
		MC203.5	CO5: Analyze different types of singularities, poles and residues, apply Residue theorem to compute complex	3	2	1	1	-	-	-	1	-	-	-	2	2	1	1
			line integrals and real integrals.															
		MC203.6	CO6: Identify the Z and inverse Z transformations for continuous time and discrete time signals and solve	3	2	1	1	-	-	-	1	-	-	-	2	2	1	-
			difference equations as their applications.															
8	(MC204)	MC204.1	CO1: Apply numerical methods to obtain the approximate solutions to the linear and non-linear transcendental	3	3	1	1	-	1	-	1	-	-	-	2	2	2	1
	Scientific		and polynomial equations.															
	Computing	MC204.2	CO2: Describe the Eigen value problems for the system of linear algebraic equations and analyze the	3	3	1	1	1	1	-	1	-	-	-	2	2	2	1
	(B.Tech.		applications.															
	Semester-4)	MC204.3	CO3: Identify numerical methods for various mathematical operations and tasks, such as interpolation formulae	3	2	1	1	-	-	1	1	-	-	-	2	2	2	1
			like forward, backward, and divided difference formulae.															
		MC204.4	CO4: Apply the appropriate techniques for numerical differentiation and integration problems	3	2	1	1	1	1	1	1	1	-	-	2	2	2	1
		MC204.5	CO5: Design the numerical solution of initial value problems of the ordinary differential equations with implicit	3	2	1	1	-	-	-	1	1	-	-	2	2	2	1
			and explicit methods as appropriate															
		MC204.6	CO6: Compare the computational methods for advantages and drawbacks, choose the suitable computational	2	1	1	-	1	1	-	1	-	-	-	2	2	2	1
			methods among several existing methods															
		MC204.7	CO7: Implement numerical methods in Matlab and write efficient, well documented Matlab code and present	1	1	1	-	1	-	1	1	-	-	-	2	2	2	1
			numerical results in an informative ways.															
9	(MC205)	MC205.1	CO1: Prepare the data set and Summarize its main features. (exploratory data analysis). Also student shall be	3	3	2	1	-	2	1	1	-	-	-	-	3	1	3
	Probability &		able to calculate and infer for real problems on the basis of probabilistic theory.															
	Statistics	MC205.2	CO2: Describe and identify the various probability distribution function and infer their statistical properties. The	3	3	3	2	1	1	1	1	-	-	-	-	3	1	2
	(B.Tech.		student shall be able to derive the relation between bivariate random variables.															
	Semester-3)	MC205.3	CO3: Analyze and apply the laws of Sampling. Also, be able to perform random sampling, identify the methods	3	2	3	-	2	2	-	1	-	-	-	-	3	2	2
			of estimation and main properties of estimators and find confidence intervals for parameter estimates.															
		MC205.4	CO4: Compute and interpret the results of Bivariate Regression and Correlation Analysis, for forecasting and	3	-	2	-	1	2	-	1	-	-	-	-	2	1	2
			investigating the relationships between them. Define and perform hypothesis testing and perform ANOVA.															
		MC205.5	CO5: Demonstrate the qualitative and quantitative properties of data using appropriate diagrams, tabulations,	1	-	2	1	2	1	-	1	-	3	-	2	-	-	2
			hypotheses testing and summaries using SPSS.															
		MC205.6	Implement probabilistic and statistical models in a computational setting and apply relevant software packages	2	1	3	1	3	1	-	1	-	2	-	3	1	-	2
			to formulate, solve and analyze the inter-disciplinary real-world problems and for higher study and research.															
10	(MC206)	MC206.1	CO1: Describe the basic structure of computer and control unit operations.	2	1	2	-	1	-	1	1	-	-	-	2	1	-	-
	Computer	MC206.2	CO2: Evaluate and perform computer arithmetic operations.	2	2	3	-	1	-	-	1	-	-	-	2	-	2	-
	Organization &	MC206.3	CO3: Analyze and design memory organization that uses banks for different word size operations.	1	2	3	1	2	2	-	1	-	-	-	2	1	-	1
	Architecture	MC206.4	CO4: Classify and examine the concept of cache mapping techniques.	2	2	2	-	1	-	1	1	-	-	•	2	1	3	-
	(B.Tech.	MC206.5	CO5: Explain and interpret the concept of I/O organization.	1	1	-	-	1	2	2	1	-	-	•	2	2	-	2
	Semester-4)	MC206.6	CO6: Demonstrate and conceptualize instruction-level parallelism.	1	2	3	1	1	-	1	1	-	-	•	2	1	2	-
11	(MC207)	MC207.1	CO1:Compute homogeneous linear system of differential equations by matrix method.	3	3	3	2	1	1	1	1	-	2	3	2	3	3	3
	Engineering	MC207.2	CO2: Apply initial and boundary conditions in Sturm-Liouville problem and evaluate the eigen values, eigen	2	2	2	1	1	2	1	1	-	2	2	2	3	2	1
	Analysis and		functions, critical points, phase plane.															
	Design	MC207.3	CO3: Identify the techniques to form linear and non-linear of order one and higher order partial differential	2	3	3	2	1	2	1	2	-	-	3	1	3	2	2
	(Differential		equations and evaluate the solutions by various methods.															
	Equations and	MC207.4	CO4: Classify and examine the second order partial differential equations.	2	3	3	2	1	1	1	1	-	-	3	1	3	2	2
	Applications)	MC207.5	CO5:Evaluate the boundary value and Cauchy's problems.	2	3	3	2	1	1	1	1	-	1	2	1	2	1	1
	(B.Tech.	MC207.6	CO6: Analyse the physical significance of Fourier series and Fourier transform techniques in solving one and two	2	2	2	2	1	1	1	1	1	-	2	1	2	1	1
	Semester-3)		dimensional heat flow and one dimensional wave equation.															

	4			1 -			1		1			1	1	1		-	-	L - 1
12	(MC208) Linear	MC208.1	CO1: Use computational techniques and algebraic skills essential for the study of systems of linear equations,	3	1	1	-	1	-	1	1	-	-	-	1	3	2	2
	Algebra		matrix algebra, vector spaces, eigenvalues and eigenvectors, orthogonanty and diagonalization.	-	-	-			1.		l .					-	-	-
	(B.Tech.	MC208.2	CO2: Use visualization, spatial reasoning, as well as geometric properties and strategies to model, solve	2	2	2	-	1	1	1	1	-	-	-	1	3	3	2
	Semester-4)		problems, and view solutions, especially in R2 and R3, as well as conceptually extend these results to higher															
			dimensions.															
		MC208.3	CO3: Interpret and analyze numerical data, mathematical concepts, and identify patterns to formulate and	1	2	3	-	1	-	1	1	1	3	-	-	2	1	2
			validate reasoning.															
		MC208.4	CO4: Use technology, where appropriate, to enhance and facilitate mathematical understanding, as well as an	1	2	2	-	1	1	1	1	-	2	1	1	2	2	2
			aid in solving problems and presenting solutions.															
		MC208 5	CO5: Communicate mathematical statements, ideas and results, both verbally and in writing, with the correct	-	-		-		-	1	1		3	3	-	2	1	2
		Incedo.5	use of mathematical definitions, terminology and symbolism							-	-		J	5		-	-	-
		MC208 6	COE Describe inner product spaces billinger forms and paritive definiteness of real guadratic forms	1	1		1		2	1	1					2	2	2
	(1.1.0.0.1)	IVIC208.0	Cool. Describe inner product spaces, binnear forms and positive definiteness of real quadratic forms.	1	1	-	1	-	2	1	1	-	-	-	-	2	2	2
13	(MC301)	MC301.1	CO1: List the design principles of the operating system and describe the Process concept and define the task	2	3	2	-	-	1	-	1	-	-	-	1	1	-	-
	Operating		required for process.			_												
	System	MC301.2	CO2: Compare the performance and design trade-offs of design options and issues involved in CPU scheduling,	3	1	3	1	2	-	-	1	-	1	1	-	2	3	1
	(B.Tech.		Process synchronization, and disk management.															
	Semester-5)	MC301.3	CO3: Explain the concepts of memory management techniques (main memory, virtual memory, and hard disk)	3	3	2	1	1	1	-	1	1	1	-	1	2	3	1
			and how to allocate space to files, so as to utilize memory at its optimum level.															
		MC301.4	CO4: Identify the state of deadlock in the system and suggest ways to handle the situation.	3	3	3	1	1	2	-	1	-	-	1	-	1	2	-
		MC301.5	CO5: Implementing operating system concepts and system calls.	3	2	2	1	1	-	-	-	-	-	-	-	1	3	-
14	(MC302)	MC302 1	CO1: Describe the fundamental elements of relational database management systems and related concents	1	-	1.	Ē	1	1	_	1	-	-	-	-	2	-	1
14	Database	MC302.2	CO2: Evaluate the basic concents of different data models, relational database design, relational algebra, and	2	2	2	_	1	1	-	2	1	2	2	_	1		-
	Management	1010302.2	COL Explain the basic concepts of dimensional inducts, relational database design, relational algebra, and	3	2	3	-	-	-	-	2	-	2	3	-	-	-	-
	System/B Tech	146303.3	SQL. Design Ex-models to represent rear-me database applications.	2	2	-	1	-	1	1	4		2	2			2	
	System(D. rech.	IVIC302.3	CO3: Apply the concepts to design the relational database from the ER-model and formulate SQL and PL/SQL	3	3	3	1	1	1	1	1	1	2	2	-	-	2	-
	Jennester-0)		queres for implementation and maintenance of the database.	-	-	-			1.		1.		-	-				
		MC302.4	CO4: Improve the database design by performing the concept of normalization.	3	3	3	-	1	1	1	1	-	-	3	-	1	-	-
		MC302.5	CO5: Apply basic database storage structures and access techniques like file and page organizations, indexing	2	1	1	1	-	1	-	1	-	-	-	-	-	3	1
			methods including B tree, and hashing for optimal database organization.															
		MC302.6	CO6: Describe and apply the transaction processing and concurrency control techniques.	3	3	3	-	3	1	-	3	-	3	3	-	1	1	2
15	(MC303)	MC303.1	CO1: Identify the type of the random process associated with the physical phenomena and model the process.	3	2	1	1	1	1	1	1	-	-	-	2	3	2	-
	Stochastic	MC303.2	CO2: Apply random processes concepts to solve engineering and other related problems.	3	2	2	1	1	-	-	1	1	1	1	-	2	2	1
	Processes	MC303.3	CO3: Model the physical situation for multidisciplinary problems/fields to suitable random process and analyse	2	2	2	1	1	-	1	2	1	-	-	1	2	3	2
	(B.Tech.		that for better project management and finance.															
	Semester-5)	MC303.4	CO4: Justify computing skills MATLAB/SPSS to design and analyse interdisciplinary problems to provide logical	2	2	2	1	1	1	1	1	-	-	-	2	2	3	2
			conclusion to problems affecting the industry and society in general.	_	_	_	_	-	_	_	_				-	_	-	_
		MC303 5	COS: Describe and justify the annications of the random processes for research and higher study	2	1		1	-	1					2	2	1	2	3
16	(MC304)	MC304 1	CO1: Demonstrate knowledge of basic matematical models of computation and describe how they relate to	2	-	2	2	-	-	1	1	-	_	-	1	2	1	-
10	(NC304) Theory of	1010304.1	machine languages	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-
	Computation	146304.3	matume languages.	-	2	4	-			4					2	2		4
	(P. Toch	IVIC304.2	CO2: Deduce analytically the problem-solving situations in related areas of theory in computer science.	3	2	1	-	1	-	1	1	-	1	-	2	3	-	1
	(B. Tech.	WIC304.3	CO3: Apply mathematical foundations, algorithmic principles and computer science theory to the modeling and	1	3	-	2	1	-	1	1	-	1	-	2	2	3	1
	Semester-o)		analysis of computer based systems of varying complexity.			_												
		MC304.4	CO4: Demonstrate an increased level of mathematical sophistication and explain the applications of machine	1	2	2	1	-	-	1	1	-	1	-	1	2	-	1
			models to compiler theory and parsing.															
		MC304.5	CO5: Apply the skills gained for higher study and research.	2	1	1	3	1	-	-	1	-	2	-	3	1	1	3
				1	1	1		1			1		1	1				
				1														
				1	1	1		1			1		1	1				
				1							1							
				1														

17	(MC305)	MC305.1	CO1: Solve linear programming problems using appropriate techniques and optimization solvers, interpret the	1	3	3	-	1	2	1	-	-	2	-	-	-	3	2
	Operations		results obtained.															
	Research	MC305.2	CO2: Analyze any real life system with limited constraints and depict it in a model form.	-	-	2	3	-	1	-	1	-	2	2	-	3	3	-
	(B.Tech.	MC305.3	CO3: Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/	2	-	3	1	1	1	1	1	-	1	-	3	2	2	1
	Semester-5)		Maximization of profits of shipping products using various methods, Finding initial basic feasible and optimal															
			solution of the Transportation problems															
		MC305.4	CO4: Analyze different queuing situations, network scheduling problems and find its optimal solutions using	2	1	2	2	1	-	2	1	-	-	3	2	2	2	2
			various operational research techniques.															
		MC305.5	CO5: Employ the analytical and practical skills in real life acquired during the course.	-	2	-	-	-	-	-	2	-	-	-	2	-	2	2
18	(MC306)	MC306.1	CO1: Describe the financial market and various terminologies used. List the assumptions for mathematical	2	1	-	1	-	1	1	1	-	2	2	1	1	-	-
	Financial		modelling of financial markets. Categorize the types of instruments traded in the financial markets. Describe the															
	Engineering		financial market and various terminologies used. List the assumptions for mathematical modelling of financial															
	(B.Tech.		markets. Categorize the types of instruments traded in the financial markets.															
	Semester-6)	MC306.2	CO2: Compute the risk and return attached with risky and risk free instruments. Pricing of Bonds, Forward, and	3	2	2	1	1	2	-	1	2	1	1	2	2	2	2
			Future and apply to real problem.															
		MC306.3	CO3: Do the option pricing using various models. Effectively compute the volatility and its impact on derivative	2	1	3	2	2	-	1	-	-	1	-	1	2	2	1
			pricing.															
		MC306.4	CO4: Define the stochastic processes, and calculus for forming and solving stochastic differential equations.	3	3	3	2	2	1	1	1	-	-	2	3	3	2	1
			Apply the Stochastic calculus in option pricing, and other real world and engineering problem. Define the															
			stochastic processes, and calculus for forming and solving stochastic differential equations. Apply the Stochastic															
			calculus in option pricing, and other real world and engineering problem.															
		MC306.5	CO5: Explain the portfolio and to compute the risk and return attached with it. Construct a multi asset portfolio	1	1	2	3	1	-	-	1	-	1	2	1	1	1	2
			with minimum risk and maximum return. Use the skill for financial management.															
		MC306.6	CO6: Apply the computing skill to formulate, solve and analyze of interdisciplinary real world problems, and for	3	3	3	3	-	-	1	1	-	1	-	3	3	2	2
			higher study and research.															
19	(MC307)	MC307.1	CO1: Define the features of C++ and Java supporting object- oriented programming.	2	-	-	-	-	-	1	1	-	-	-	-	1	-	-
	Object	MC307.2	CO2: Identify classes, objects, members of a class and relationships among them needed for a specific problem.	3	2	3	-	2	1	1	1	-	-	-	-	1	2	-
	Oriented	MC307.3	CO3: Explain how to apply the major object-oriented concepts such as encapsulation, inheritance and	2	2	3	-	1	1	1	1	2	1	1	2	-	2	-
	programming		polymorphism to implement object oriented programs in C++ and Java.															
	(B.Tech.	MC307.4	CO4: Develop, compile and test programming solutions of real life problems in C++ and Java.	1	3	2	-	1	1	1	1	-	-	2	-	1	-	1
	Semester-5)	MC307.5	CO5: Implement error handling techniques using exception handling in object oriented programs in C++ and	2	2	2	-	2	-	1	1	-	1	2	2	-	2	1
			Java.															
		MC307.6	CO6: Design and develop Java application programs using Applets and Swings.	3	2	2	-	2	1	-	1	-	1	2	2	3	1	-
20	(MC308)	MC308.1	CO1: Define basic computer network terminology and describe Data Communications System and its	3	2	2	1	-	1	-	1	-	-	-	2	3	1	1
	Computer		components.															
	Networks	MC308.2	CO2: Analyze the way protocols are currently used in the Internet and the requirements for designing network	3	2	1	2	1	-	1	1	-	-	1	2	3	2	1
	(B.Tech.		protocols.															
	Semester-6)	MC308.3	CO3: Illustrate the layers of the OSI model and TCP/IP reference model and also describe the function(s) of each	2	2	3	2	1	1	1	1	1	1	1	3	2	2	1
			layer.															
		MC308.4	CO4: Classify different types of physical layer transmissions and various transmission media with real-time	2	3	3	1	-	1	-	1	-	-	1	1	3	2	1
			applications.															
		MC308.5	CO5: Classify the routing protocols and analyze how to assign the IP addresses for the given network.	3	3	3	3	2	2	1	2	2	2	-	2	3	3	2
		MC308.6	CO6: Identify the different types of network devices and their functions within a network.	3	3	2	2	1	2	1	2	1	1	2	2	3	2	1
21	(MC309)	MC309.1	CO1: Apply Euclid's algorithm in divisibility/daily life problems.	2	1	3	1	1	1	1	1	1	-	1	1	2	2	1
	Number	MC309.2	CO2: Solve linear congruence equations.	3	3	2	2	2	2	1	-	1	-	1	2	3	2	2
	Theory	MC309.3	CO3: Describe various arithmetical functions like Euler phi function and apply these in simplifying various	2	2	2	1	1	1	-	-	1	-	1	1	2	1	2
	/			•				-										
	(B.Tech.		arithmetical problems.															
	(B.Tech. Semester-5)	MC309.4	arithmetical problems. CO4: Check whether a number is prime or not by invoking primality tests.	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1

22	(MC310)	MC310.1	CO1: Describe software characteristics, its components and applications; demonstrate the ability to apply	2	1	2	-	1	-	-	-	1	1	-	-	2	1	-
	Software		software development life cycle models in software projects.															
	Engineering	MC310.2	CO2: Collect software requirements from customers, analyze, document and verify them.	2	1	2	-	1	-	-	1	1	1	-	-	1	2	-
	(B.Tech.	MC310.3	CO3: Apply software design concepts to meet the specific requirements of customers with consideration of	2	1	3	-	1	-	1	1	1	1	-	-	3	-	-
	Semester-6)		factors such as cost, reusability, maintenance, flexibility, reliability and ethics.															
		MC310.4	CO4: Demonstrate the ability to apply software project management concepts to deliver a high-quality product	2	2	1	-	-	1	1	1	1	1	-	-	-	-	3
			on time and within budget.															
		MC310.5	CO5: Apply the knowledge of modelling, measurement and improvement of software reliability.	2	2	1	-	-	-	1	1	1	1	-	-	2	-	-
		MC310.6	CO6: Evaluate an attribute of a program or a system by applying various testing techniques.	1	1	1	-	-	-	-	1	1	1	-	-	2	2	-
23	(MC312)	MC312.1	CO1: Describe the key components of the Artificial Intelligence field and their role in Computer Science.	3	2	1	-	2	1	-	1	-	-	-	2	3	2	1
	Artificial	MC312.2	CO2: Identify and describe Artificial Intelligence techniques such as search heuristics, knowledge	3	2	2	1	1	1	1	1	1	1	1	-	3	2	2
	Intelligence.		representation, automated planning, agent systems, and probabilistic reasoning.															
	(B.Tech.	MC312.3	CO3: Identify and apply Artificial Intelligence techniques to wide range of problems, including complex problem	2	2	2	1	2	-	-	1	1	1	2	1	2	3	3
	Semester-6)		solving via search, knowledge-based systems, machine learning, probabilistic models, agent decision making,															
			etc.	-	_	_		_	-		-				_	-		-
		MC312.4	CO4: Analyze and compare the computational trade-offs involved in applying different AI techniques and	2	2	2	1	3	1	1	1	-	-	1	2	1	2	3
			models.	-				-	-					-	-		-	
		MC312.5	COS: Design and develop programs in programming languages such as Prolog and Lisp.	2	1	-	1	3	1	-	1	-	-	2	2	2	1	2
		MC312.6	CO6: Compare Artificial Intelligence with paradigms such as Machine Learning, Deep Learning, Rule Based	2	1	-	1	3	1	1	1	-	-	3	2	1	1	2
24	(MC215)	NAC21E 1	Systems and expert systems.	2	2	2	1	1			1	1		1	2	2	1	1
24	(IVIC315) Modern	IVIC315.1	COT: identify anterent algebrait structures like groups, rings, lields etc. and to apply them in various	2	3	2	1	1	-	-	1	1	-	1	3	2	1	1
	Algebra	MC21E 2	engineering and science related problems.	2	2	2	2	1	1	1	1	1		1	2	1	2	2
	(B Tech	WIC515.2	colz. Biend concepts of Modern Algebra with various engineering tools to evolve new fideas to solve practical	2	3	3	2	1	1	-	1	1	-	1	3	1	2	2
	Semester-5)	MC315.3	prometris. CO3: Analyze set of polynomials as special type of ring viz PID and design ring related applications especially in	1	2	2	3	1.	_	_	1	1	1	1.	2	1	2	1
	,	WIC515.5	the field of computer science.	-	-	-	5	_	-	_	-	-	-	_	-	-	2	-
		MC315.4	CQ4: Apply ring theory in factorizing the polynomials and hence finding the roots of polynomials which can be	2	3	3	2	-	1	1	1	-	-	1	3	1	2	2
			utilized in various engineering and science research projects.	-	•	•	-		-	-	-			-	•	-	-	-
25	(MC317)	MC317.1	CO1: Interpret the basics of finite precision arithmetic, conditioning of problems and stability of numerical	2	1	2	3	1	2	1	2	-	1	3	2	3	2	3
	Numerical		algorithms.				-							-		-		-
	methods for	MC317.2	CO2: Solve dense systems of linear equations and least squares problems and have a working knowledge of	3	2	2	3	1	1	1	2	-	2	3	3	3	3	3
	ODE (B.Tech.		various methods.															
	Semester-5)	MC317.3	CO3: Differentiate and apply appropriate techniques for numerical differentiation and integration.	3	2	2	1	1	1	1	-	-	-	2	1	3	1	2
		MC317.4	CO4: Solve initial value problem ordinary differential equations with explicit or implicit methods as appropriate.	2	2	3	2	1	1	1		1	-	2	2	з	2	2
		MC317.5	CO5: Analyze the stability of the numerical schemes applied to various types of ODE's.	3	3	2	2	1	1	-	-	-	1	1	1	3	1	2
26	(MC318)	MC318.1	CO1: Explain the basics of computer graphics, different graphics systems, and applications of computer graphics.	3	2	2	2	-	•	1	1	1	2	-	2	2	1	-
	Computer	MC318.2	CO2: Discuss various algorithms for scan conversion and filling of basic objects and contrast their performance	3	2	1	-	1	-	-	1	-	-	-	-	-	3	-
	Graphics		trade-offs.															
	(B.Tech.	MC318.3	CO3: Apply and evaluate geometric transformations on 2D and 3D objects and their applications in composite	1	1	1	1	-	-	-	1	-	-	-	-	2	1	-
	Semester-6)		form.															
		MC318.4	CO4: Create a scene with different clipping methods and its transformation to the graphics display device.	1	1	2	1	1	-	1	1	-	-	-	-	1	2	1
		MC318.5	CO5: Analyze projections and visible surface detection techniques for the display of 3D scenes 2D screen.	2	2	1	1	1	-	-	1	-	1	-	-	3	2	1
		MC318.6	CO6: Apply the attained knowledge to render projected objects to naturalize the scene in 2D view and use of	2	2	1	2	1	-	2	1	-	-	-	1	1	1	1
			illumination models for this.															
								1										
								1										
								1										
								1										
								1										

27	(MC319) Complex	MC319.1	CO1: Integrate various ideas and techniques of complex analysis in a comprehensible manner; thus, stimulating new research.	2	2	1	1	-	-	1	-	-	-	-	-	2	2	1
	Analysis (B. Tech	MC319.2	CO2: Identify the role and applications of complex analysis in mathematical modelling, physics and in many	2	2	1	1	1	1	1	1	-	-	-	1	2	2	1
	Semester-5)	MC319.3	CO3: Apply appropriate complex analysis techniques in solving science and engineering related problems arising	3	2	1	1	1	1	-	1	-	-	-	1	2	2	1
		N4C210 4	in various neitos such as mechanical, electrical and aerospace.	2	2	1	1			1	1				1	-	2	1
20	(MC220) W/ah	MC319.4	CO1: Describe use of new techniques of complex analysis in applied mathematics and real-line applications.	3	2	1	1	-	-	1	1	-	-	-	1	2	2	1
28	(IVIC320) Web	NIC320.1	CO1: identify basic principles of Networking.	2	2	1	1	1	-	1	1	-	-	-	-	2	1	1
	(B Toch	NC320.2	CO2: Describe the concept of e-mail, teinet and useret.	2	-	-	1	-	1	1	2	-	-	-	-	2	1	1
	Semester-6)	MC220.3	CO1: Design web region and web sites	1	2	-	1	1	-	1	1	-	-	-	1	2	1	1
	concerter of	MC220.4	COEL Design web pages and web sites.	3	2	2	1	1	1	1	1	-	-	1	1	2	1	1
20	(MC222)	MC222.3	COst moniporate database connectivity with web pages.	3	2	3	2	2	1	-	1	-	1	-	1	2	1	1
29	(INIC322) Cluster & Grid	MC322.1	CO1: Describe the hardware and software technologies used for cluster computing.	2	1	2	3	2	1	1	1	-	-	-	2	2	2	1
	Computing	MC222.2	CO2: Compare the programming paradigms and performance of standard wer variants.	2	2	2	2	2	1	2	1	-	-	-	2	2	1	2
	(B.Tech.	1010322.5	Corvices and other business cloud annicrations	3	2	2	3	3	-	3	-	-	-	2	2	-	-	2
	Semester-6)	MC322.4	Services, and other pushess cloud approactions.	2	1	1	2	2	1	1	1	-	1.	_	2	2	1	1
	•	MC322.5	COS: Design antification of generating the company to the provide the top protocol and the company of the compa	2	2	3	2	2	1	2	1	-	1	2	2	1	2	2
30	(MC324) Big	MC324.1	CO1: Identify the challenges and their solutions in Big Data Application.	3	2	2	1	1	2	1	1	-	-	-	1	1	2	1
	Data Analytics	MC324.2	CO2: Demonstarte the understanding of the Hadoop Framework and eco systems.	2	2	2	-	1	-	-	1	-	-	-	1	2	2	1
	(B.Tech.	MC324.3	CO3: Analyse the Big Data using Map-reduce programming in Hadoop.	2	1	2	1	1	1	1	-	-	-	-	1	2	1	2
	Semester-6)	MC324.4	CO4: Demonstrate the applications of Big Data Using Pig and Hive.	2	1	2	2	1	2	-	1	-	-	-	1	2	1	1
		MC324.5	CO5: Visualize the data with visual data analysis techniques.	1	1	1	2	1	-	-	1	1	-	-	1	1	2	2
		MC324.6	CO6: Illustrate and implement the concepts by taking an application problem.	3	3	2	2	2	-	1	1	-	-	-	2	2	2	1
31	(MC401)	MC401.1	CO1: Identify complex engineering/real-life problems, and explore creative avenues of expression.	3	2	1	-	-	1	-	1	1	-	-	-	1	-	-
	B.Tech.	MC401.2	CO2: Compare, contrast, and criticize the existing work for the problem under consideration.	-	3	-	3	-	-	-	1	1	-	1	1	-	1	1
	Project-I	MC401.3	CO3: Develop a methodology and design strategy to implement the project using appropriate tools and	-	-	3	2	3	1	2	1	2	-	2	1	2	3	-
	(B.Tech. Semester-7)	MC401 4	components COA: Acquire articulate and convey observations and conclusions using a verbal and non-verbal methods of		-				-		2	2	3	1	2		-	2
	-		communication.								_	-	<u> </u>	-	-			-
32	(MC402)	MC402.1	CO1: Formulate a conceptual project design and conduct experiments using appropriate tools and components.	2	1	3	2	3	1	2	1	2	-	2	1	2	3	-
	B.Tech.	MC402.2	CO2: Evaluate the outcomes of the project qualitatively and quantitatively.	-	-	3	3	-	-	-	1	1	-	-	1	-	-	2
	Project-II (B.Tech.	MC402.3	CO3: Apply principles of ethical behaviour, collaborative engagement, socially responsible behavior, and respect for individuals for effective team management.	-	-	-	-	-	2	2	3	3	2	3	2	-	-	3
	Semester-8)	MC402.4	CO4: Prepare, and communicate the work in the form of a research article and present the same.	2	-	-	-	-	-	-	1	2	3	2	2	-	-	2
33	(MC403)	MC403.1	CO1: Hands-on Experience with various tools and techniques for product development.	1	2	3	1	3	-	-	1	-	-	-	1	2	3	-
	Training	MC403.2	CO2: Designing/improving the solution for real-life problems.	1	3	3	2	1	-	2	-	-	-	-	1	3	3	-
	Seminar (B.Tech.	MC403.3	CO3: Apply principles of ethical behaviour, collaborative engagement, socially responsible behavior, and respect for individuals for effective team management.	-	-	-	-	-	2	2	3	3	2	3	2	-	-	3
	Semester-7)	MC403.4	CO4: Acquire, articulate, and convey the learning during the product development using a verbal and non-verbal methods of communication.	-	-	-	-	-	-	-	2	2	3	1	2	-	-	2
34	(MC404)	MC404.1	CO1: Apply computational techniques and algebraic skills essential for the study of systems of linear equations.	2	1	2	-	1	-	-	1	1	1	-	-	1	2	3
-	Matrix		matrix algebra, vector spaces, eigenvalues and eigenvectors, orthogonality and diagonalization.															-
	Computation (B.Tech.	MC404.2	CO2: Choose an appropriate numerical method to solve systems of linear equations, least squares problems, and the eigenvalue problem.	2	1	2	-	1	-	-	1	1	1	-	-	2	3	1
	Semester-8)	MC404.3	CO3: Evaluate and compare the efficiency and numerical stability of different algorithms for solving linear sustained locat squares problems and the signary linear using matrix ports.	2	1	3	-	-	-	2	1	1	1	-	-	1	2	1
		MC404 4	systems, reast squares problems, and the eigenvalue problem using matrix norms.	2	2	1	-	-	_	_	-	1	1	_		2	1	2
		1410404.4	symmetric positive definiteness,	2	-			-				-	<u> </u>			2	-	<u></u>
l		MC404.5	CO5: Quantify the sensitivity of a linear system or least squares problem to perturbations in the data.	2	2	1	-	-	-	-	1	1	1	-	-	2	1	2

35	(MC405) Graph	MC405.1	CO1: Demonstrate the basic concepts of graph theory and use them as a modeling tool.	1	-	2	-	1	-	-	1	-	1	-	1	3	-	-
	Theory	MC405.2	CO2: Apply the algorithms that are treated in the course for solving graph theoretical problems.	2	3	-	-	1	-	-	-	-	-	-	2	2	2	1
	(B.Tech. Semester-7)	MC405.3	CO3: Identify the applications of graphs in the areas of computer science, biology, chemistry, physics, sociology, and engineering.	3	2	1	-	1	-	-	1	-	1	-	2	2	-	1
		MC405.4	CO4: Recognize the applied problems occurring in real world and use the concepts of graph theory to analyze and solve them.	2	3	2	-	1	-	-	-	-	2	-	2	3	2	1
		MC405.5	CO5: Apply the skills gained for higher studies and research.	1	1	1	3	1	2	-	1	-	2	-	3	1	1	3
36	(MC406)	MC406.1	CO1: Cossify and form partial differential equations (PDFs), apply a range of techniques to find solutions of first	3	3	2	1	2	-	-	1	1	1	-	-	2	1	-
	Partial		order partial differential equations.	-			-	_			-	-	-			_		
	Differential	MC406.2	CO2: Identify the initial and boundary values problems for second and higher-order PDEs, transform second-	3	3	3	2	2	1	-	1	1	1	-	-	2	1	-
	Equations		order PDEs to canonical or normal form, distinguish qualitative differences between elliptic, parabolic and															
	(B.Tech.		hyperbolic equations, solve second-order equations using various methods.															
	Semester-8)	MC406.3	CO3: Determine accurate and efficient use of Fourier analysis techniques and their applications in the theory of	2	2	3	2	1	1	-	1	1	1	-	-	3	2	-
			PDEs for some standard second-order PDEs.															
		MC406.4	CO4: Demonstrate capacity to model physical phenomena using classical PDEs such as the wave equation, the	-	-	-	-	3	2	1	1	1	2	1	-	3	3	-
			Laplace equation and the heat (diffusion) equation.															
		MC406.5	CO5: Apply problem-solving using concepts and techniques from PDEs like Duhamel principle, maximum and	-	-	-	-	2	2	2	1	1	2	1	-	2	2	-
			minimum principles etc. and Fourier analysis applied to diverse situations in physics, engineering and in other															
			mathematical contexts.															
37	(MC407)	MC407.1	CO1: Classify the various classical encryption techniques.	3	1	1	-	-	-	-	1	-	-		1	2	1	1
	Cryptography	MC407.2	CO2: Describe and analyze modern block ciphers, public key cryptosystems and key exchange algorithms.	3	2	1	-	2	1	1	1	1	1	-	-	1	2	1
	& Network	MC407.3	CO3: Explain various message authentication algorithms and their applications and demonstrate the	2	1	1	-	1	-	1	1	1	1	-	-	2	1	1
	Security		understanding of private key management and digital signature algorithm.															
	(B.Tech.	MC407.4	CO4: Explain the concept of IP security and web security and describe various security protocols (SSL, TLS, TSP,	2	2	2	-	-	-	2	1	-	1	-	1	2	2	2
	Semester-7)		SET etc.), firewall and VPN.															
38	(MC408)	MC408.1	CO1: Identify and enlist the various components for process and product control related to a specific	1	-	2	-	1	-	-	-	-	1	-	1	3	-	-
	Quality Control		industrial/engineering problem.															
	and Design	MC408.2	CO2: Acquire knowledge to analyze and interpret data related to the process control.	2	3	-	-	1	-	-	1	-	-	-	2	2	2	1
	Making	MC408.3	CO3: Design suitable sampling plan for investigating and analyzing. The problem relating to industrial output on	3	2	1	-	1	-	-	1	-	1	-	2	2	-	1
	(B.Tech.		the basis of the data obtained.															
	Semester-8)	MC408.4	CO4: Analyze the time series data and suggest a suitable forecast model for better management of resources and providing valid solution.	2	3	2	-	-	-	-	1	-	2	-	2	3	2	1
		MC408.5	CO5: Analyze the industrial production model in tune with technological changes.	1	1	1	3	1	2	-	1	-	2	-	3	1	1	3
39	(MC409)	MC409.1	CO1: Demonstrate an understanding of concepts of modelling and simulation, by extracting the necessary and	2	1	2	-	1	-	-	1	1	1	-	1	1	2	3
	Mathematical		relevant information regarding the problem.															
	Modeling &	MC409.2	CO2: Construct various mathematical models of real-world problems.	2	1	2	-	1	1	-	2	1	1	1	-	2	3	1
	Simulation	MC409.3	CO3: Solve the mathematical models with the help of various software like Matlab.	2	1	3	1	-	1	1	3	1	1	2	1	1	2	1
	(B.Tech.	MC409.4	CO4: Operate qualitative analysis on the non-linear mathematical models.	2	2	1	-	-	-	-	1	1	1	1	1	2	1	2
	Semester-7)	MC409.5	CO5: Simulate the model using numerical and statistical techniques.	2	2	1	1	2	2	-	-	1	1	-	-	2	1	2
40	(MC410)	MC410.1	CO1: Describe Topological spaces and use their properties in different areas of Mathematics.	2	2	1	1	1	-	1	1	-	-	-	-	2	1	1
	Topology	MC410.2	CO2: Apply theoretical concepts in topology to understand real world applications.	2	-	-	1	-	1	1	2	-	-	-	-	1	2	1
	(B.Tech.	MC410.3	CO3: Adapt the logical ideas of topology in other fields of engineering to develop mathematical models, which	1	2	-	1	-	-	1	1	-	-	-	1	2	1	1
	Semester-8)		would meet the current needs of the industry.															
		MC410.4	CO4: Apply the skills gained for to real life problems and research.	3	2	2	1	1	1	1	1	-	-	1	1	2	2	2

41	(MC411) Data	MC411.1	CO1: Identify the scope and necessity of Data Mining & Warehousing for the society.	3	2	3	1	1	1	-	1	-	1	-	1	1	2	1
	Warehousing	MC411.2	CO2: Describe the designing and architecture of Data Warehousing to solve real world problems.	3	3	3	1	2	2	1	1	1	1	2	3	3	3	3
	& Data Mining	MC411.3	CO3: Apply various tools of Data Mining and their techniques on real world problems.	3	3	3	2	2	1	2	1	1	1	2	2	3	3	2
	(B.Tech.	MC411.4	CO4: Design various algorithms specialized for data mining tasks.	2	3	3	2	2	2	2	1	1	1	2	3	2	2	3
	Semester-7)	MC411.5	CO5: Designing new Data Mining techniques and analyze them critically.	2	3	3	2	3	2	2	1	1	1	3	2	2	2	2
		MC411.6	CO6: Analyze and justify the use of a particular data mining technique for a problem.	2	2	3	1	3	2	2	1	1	1	3	2	1	1	1
		MC411.7	CO7: Compare the various approaches to data warehousing and data mining implementations.	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1
42	(MC412)	MC412.1	CO1: Analyze how ideas from different areas of mathematics in line with functional analysis combined to	3	2	1	3	1	1	-	1	-	-	-	1	1	2	3
	Functional		produce new concepts that are more effective than existing ones.															
	Analysis	MC412.2	CO2: Apply the logical skills developed in various computer applications.	3	2	-	1	1	1	-	-	-	-	-	1	2	3	1
	(B.Tech.	MC412.3	CO3: Describe and apply the theory of linear operators on a Hilbert space, including adjoint operators, self-	2	1	1	1	1	1	-	1	-	2	-	-	1	2	1
	Semester-8)		adjoint and unitary operators with their spectra to evolve innovative modals.															
		MC412.4	CO4: Formulate, solve and analyze interdisciplinary real-world problems for higher study and research.	1	2	2	1	1	1	-	1	2	1	-	1	2	1	2
43	(MC413)	MC413.1	CO1: Identify the phases of a typical compiler, including the frontend, backend, and structure of a compiler as a	3	3	2	-	1	1	-	-	-	-	-	1	2	1	-
	Compiler		sequence of distinct translation steps.															
	Design	MC413.2	CO2: Identify tokens of a typical high-level programming language, define regular expressions for tokens, and	3	2	2	1	1	2	1	1	-	-	-	1	2	1	-
	(B.Tech.		design and implement a lexical analyzer for the same.															
	Semester-7)	MC413.3	CO3: Describe the role of a parser in a compiler, compare the performance and design trade-offs of various	2	2	2	-	1	-	-	1	-	-	-	1	2	1	1
			parsers, and design and implement a parser.	-														
		WC413.4	CO4: Describe a semantic analyzer and type checking and create a syntax-directed definition and an annotated	2	1	1	1	1	1	1	1	-	-	-	1	1	1	2
		NAC412 F	parse tree.	2	1	1	1	1	2						1	1	1	1
		IVIC413.5	cos: identify the role of uniferent types of runtime environments and memory organization for the	2	1	1	1	1	2	-	-	-	-	-	1	1	T	1
		MC412.6	Implementation of typical programming tanguages.	1	1	1	1	1			1	1			1	2	1	1
		MC413.0	Cost besign and implement an intermediate code generator based on given code patterns.	2	2	2	1	1	-	-	1	1	-	-	1	2	1	1
44	(NACA1E)	MC415.7	CO1: Design a complete using a valiety of software tools and industry existing components of a complete.	3	3	2	2	2	-	1	1	-	1	-	2	1	2	2
	Wireless &	MC415.1	CO1: Describe the whereas and central releptione concepts, such as Gawin, Grida, Howa, and Howa.	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1
	Mohile	1010415.2	CO2. Analyze security, energy enclency, mobility, statability, and then unique characteristics in wheless naturate	2	2	3	2	2	-	-	-	-	-	-	2	2	3	-
	Computing	MC415 3	CO3: Compare various security and routing protocols for wireless networks	2	1	1	1	1	1	-	1	-	-	-	2	1	2	1
	(B.Tech.	MC415.4	CO4: Describe wireless networking protocols and their architecture.	1	1	2	2	2	1	-	1	-	-	-	2	2	1	2
	Semester-7)	MC415.5	CO5: Develop various mobile computing applications along with their computation methods and algorithms.	3	2	2	2	3	1	2	-	-	-	2	2	2	1	2
45	(MC417)	MC417.1	CO1: Describe the technical aspects of Multimedia System like its hardware and software.	2	2	1	1	2	1	-	1	-	-	-	2	3	3	-
	Multimedia	MC417.2	CO2: Compare various file formats for audio, video and text media.	1	1	2	1	1	1	-	1	-	-	-	2	1	1	-
	System Design	MC417.3	CO3: Differentiate between various data compression and speech compression algorithms.	1	1	2	1	-	-	-	1	-	-	-	2	2	-	-
	(B.Tech.	MC417.4	CO4: Design the database specifically for multimedia systems	2	2	2	2	2	1	-	1	-	1	2	2	1	-	-
	Semester-7)	MC417.5	CO5: Design interactive multimedia software.	3	3	2	2	3	1	2	1	-	-	2	2	2	1	2
		MC417.6	CO6: Analyze various networking protocols for multimedia applications.	1	1	2	1	1	-	-	1	-	-	-	2	1	3	1
46	(MC418)	MC418.1	CO1: Define and use optimization concepts to model the real-world applications as an optimization problem.	3	3	2	3	-	-	1	1	-	-	-	-	3	3	-
-	Optimization	MC418.2	CO2: Apply optimization methods to engineering problems, including developing a model, defining an	-	1	2	1	2	1	2	1	1	-	-	-	1	1	-
	Techniques.		optimization problem, applying optimization methods, exploring the solution, and interpreting results.															
	(B.Tech.	MC418.3	CO3: Formulate continuous problems into unconstrained and constrained optimization problems on the basis of	2	2	-	1	3	-	1	1	1	-	1	-	2	-	-
	Semester-8)		the conditions provided .															
		MC418.4	CO4: Identify computing derivatives methods for direct and adjoint cases.	1	-	2	1	1	-	1	-	-	-	-	-	1	-	-
1		MC418.5	CO5: Identify the optimization techniques to determine a robust design for a given real world problem and	2	1	2	2	-	2	1	1	-	-	1	2	2	1	2
1			justify the technique for solving it.															
		MC418.6	CO6: Employ basic optimization algorithms in a computational setting and apply existing optimization software	3	3	1	1	-	-	-	1	-	1	-	3	1	3	1
			packages to solve and analyze the inter- disciplinary real-world problems and for higher study and research.															
1		1		1		1	1	1	1	1	1	1	1	1	l I	1		1

47	(MC419)	MC419.1	CO1: Demonstrate an appreciation for what is involved in Learning models from data	3	3	2	2	2	3	2	1	1	1	2	3	3	2	3
	Machine	MC419.2	CO2: Describe a wide variety of learning algorithms including Supervised Learning, Unsupervised Learning,	3	3	3	1	2	2	2	1	1	1	2	3	3	3	3
	Learning		Reinforcement Learning.															
	(B.Tech.	MC419.3	CO3: Evaluate models generated from data using various quantitative and qualitative methods	3	3	3	2	2	1	2	1	1	1	2	2	3	3	2
	Semester-7)	MC419.4	CO4: Apply different learning algorithms to a real problem	2	3	3	2	2	2	2	1	1	1	2	3	2	2	3
		MC419.5	CO5: Present the expected accuracy that can be achieved by applying the models.	2	3	3	2	3	2	2	1	1	1	3	2	2	2	2
48	(MC420)	MC420.1	CO1: Identify and measure the uncertainty associated with discrete random experiments to analyse and	3	3	2	1	2	-	-	1	1	1	-	-	3	2	1
	Information		interpret the data.															
	Theory &	MC420.2	CO2: Describe the theoretical model associated with the various blocks of the communication system to	3	3	3	2	2	1	-	-	1	1	-	-	2	2	1
	Coding		investigate the problems for suitable designing.															
	(B.Tech.	MC420.3	CO3: Analyse the constraints associated with the encoding/decoding of information sources to facilitate in	2	2	3	2	1	1	-	1	1	1	-	-	3	2	1
	Semester-8)		finding the logical solutions.															
		MC420.4	CO4: List and design the various types of block codes suitable and analyze their errors detection and correction	-	-	-	-	3	2	1	1	1	2	1	-	2	2	1
			capabilities.															
		MC420.5	CO5: Reframe the generalised coding and decoding techniques and to correlate the theoretical models with the	-	-	-	-	2	2	2	1	1	2	1	-	2	2	1
			practical aspects.															
49	(MC422) Finite	MC422.1	CO1: Apply mathematical thinking and analytic process that involves Variational Formulations.	3	2	1	1	1	1	1	1	-	-	-	2	3	2	-
	element	MC422.2	CO2: Formulate and solve two point boundary value problems, initial value problems in one dimension.	3	2	2	1	1	-	-	1	1	1	1	-	2	2	1
	methods	MC422.3	CO3: Implement numerical methods (Variational methods) to solve problems related to solid mechanics.	2	2	2	1	1	-	1	2	1	-	-	1	2	3	2
	(B.Tech.	MC422.4	CO4: Implement the formulation techniques to solve 2-dimensional problems using triangle and quadrilateral	2	2	2	1	3	1	1	1	-	-	-	2	2	3	2
	Semester-8)		elements.															
		MC422.5	CO5: Solve complex problems having irregular geometry.	2	1	-	1	-	1	-	-	-	-	2	2	1	2	3
50	(MC424) Game	MC424.1	CO1: Identify the terminologies of game theory and solution concepts employed to predict the outcome of the	2	1	-	1	-	1	1	1	-	2	2	1	1	-	-
	Theory		game.															
	(B.Tech.	MC424.2	CO2: Analyze economic situations using game theoretic techniques.	3	2	2	1	2	2	-	1	2	1	1	2	2	2	2
	Semester-8)	MC424.3	CO3: Structure strategic problems as sequential and/or simultaneous games.	2	1	3	2	2	-	1	-	-	1	-	1	2	2	1
		MC424.4	CO4: Identify the strategies to implement.	3	3	3	2	2	1	1	1	-	-	2	3	3	2	1
		MC424.5	CO5: Apply the computing skill to formulate, solve interdisciplinary real world and engineering problems.	1	1	2	3	1	-	-	1	-	1	2	1	1	1	2
		MC424.6	CO6: Apply the knowledge to real life / enginnering problems.	3	3	3	3	-	-	1	1	-	1	-	3	3	2	2
51	(MC426)	MC426.1	CO1: Describe concepts and properties of a regular parameterized curve, tangent vectors, osculating plane,	3	3	2	1	1	-	-	1	1	1	-	1	3	1	1
	Differential		normal plane, binormal, Frenet-Serret formulae, osculating sphere.															
	Geometry	MC426.2	CO2: Find the osculating surface and the osculating curve at any point of a given curve and calculate the first	3	3	3	2	1	1	-	1	1	1	-	1	3	2	-
	(B.Tech.		and the second fundamental forms of a surface.	-	_	_	_							-	-	_	-	
	Semester-8)	MC426.3	CO3: Identify the intrinsic and extrinsic geometry of surfaces.	2	2	3	2	1	1	-	-	1	1	-	1	2	2	-
		MC426.4	CO4: Recognize the basis of notions of the theory of space curves, and the theory of surfaces in order to	-	-	-	-	1	2	1	1	1	2	1	1	2	2	-
			establish basic properties of geodesics, parallel transport, evolutes. Describe geodesics on a surface and their															
		N46436 F	Characterization.			-		2	2				-			2		
		IVIC426.5	COS Analy differential complexitience interferential sharing	-	-	-	-	2	2	1	-	1	2	1	-	2	1	-
52	(NACA22) 5	IVIC426.6	COB: Apply differential geometry in applications or theoretical physics.	1	2	2	1	1	-	1	1	-	-	-	1	2	1	-
52	(IVIC432) FUZZY	NIC432.1	CO1: classify vagueness and uncertainty in knowledge formally using the systematic approach.	3	2	2	2	-	2	2	1	-	2	-	-	3	2	-
	Set & Fuzzy	IVIC432.2	CO2: Analyse different applications based on fuzzy model, represent "vague" knowledge formally and describe	-	1	2	2	-	1	1	1	-	1	-	1	-	1	-
	Semester-8)	MC422.2	the impact on popular dynamical systems.	2	2	-				2						2	2	
	Semester of	IVIC452.5	Cost identify the fuzzy logic and fuzzy inference systems and make applications on Fuzzy logic membership	2	2	-	-	-	-	2	-	-	-	-	-	2	2	-
		MC432.4	The test of the test $r_{\rm eff}$ is the test of the traditional design approaches	3	1	2	2	2	-	_	1	-	-	-	-	3	_	_
		MC432.4	COSt Create fuzzy-logic based controllers and list their unique characteristics	1	2	-	1	1	1	-	1	-	-	-	-	1	2	
		MC432.6	CO6: Annly formulate solve and analyze the inter-disciplinary real-world problems and for higher study and	2	1	2	2	1.	1	-	1	<u> </u>	2	1.	3	2	1	1
			recearch.	1	1	-	-	1	1	-	L T	-	-	-	5	-	-	1
						1		1						1				

53	(MC434)	MC434.1	CO1: Classify multidimensional partial differential equations (PDEs), differentiate implicit and explicit methods	3	3	2	2	2	-	-	1	-	1	-	-	2	1	-
	Numerical		for PDEs, distinguish well posed and ill posed problems.														<u> </u>	
	Methods for	MC434.2	CO2: Ssolve PDEs using numerical methods, analyze numerical methods for consistency, stability and	2	3	3	2	2	-	-	1	-	1	-	-	1	1	-
	PDE (B.Tech.		convergence.															
	Semester-8)	MC434.3	CO3: Identify principal differences, strengths and weaknesses of commonly used numerical methods for PDEs.	2	1	2	2	1	-	-	1	-	1	-	-	1	1	-
		MC434.4	CO4: Employ specific numerical methods in a high-level language, and interpret numerical outputs.	1	1	1	2	2	-	-	1	-	-	-	-	-	3	-
		MC434.5	CO5: Identify appropriate numerical methods based on the characteristics of a PDE problem, physically interpret	-	2	2	-	2	-	-	1	-	-	-	-	-	1	-
			and analyze solutions in a physical context.															
54	(MC436)	MC436.1	CO1: Explain the basic concepts and methods of system description using Petri nets.	3	3	2	2	1	1	1	1	-	1	2	3	3	2	3
	Petrinet	MC436.2	CO2: Identify and utilize the most suitable class of Petri net as an extra suited tool for modeling.	3	3	3	1	1	2	1	1	-	-	-	3	3	3	3
	Theory &	MC436.3	CO3: Analyze variety of systems, at different levels of abstraction using the concept of Petri net.	3	3	3	2	1	1	1	1	-	-	-	2	3	3	2
	Application	MC436.4	CO4: Apply and develop advanced information technologies based on suitable formal models and theories for	2	3	3	2	1	2	1	1	-	-	-	3	2	2	3
	(B.Tech.		automating the design, implementation, and verification of computer-based systems.															
	Semester-8)	MC436.5	CO5: Formulate, solve and analyse interdisciplinary current world problems for higher study and research.	2	3	3	2	1	2	1	1	1	1	1	2	2	2	2
55	(MC438)	MC438.1	CO1: Identify the initial step to get a better understanding of different types of tensors and some important	3	2	1	-	1	1	-	1	-	-	-	2	3	2	1
	Tensor		mathematical properties of tensors.															
	Calculus	MC438.2	CO2: Demonstrate an understanding of metric tensor, hypersurfaces and congruence of curves.	3	2	2	1	1	1	1	1	1	1	1	-	3	2	2
	(B.Tech.	MC438.3	CO3: Determine the Christoffel symbols and covariant derivatives which are used in general relativity.	2	2	2	1	1	-	-	-	1	1	2	1	2	3	3
	Semester-8)	MC438.4	CO4: Calculate the Riemann Christoffel tensor, Ricci tensor, scalar curvature and Einstein tensor.	2	2	2	1	3	1	1	1	-	-	1	2	1	2	3
		MC438.5	CO5: Apply tensor calculus in some advanced applications to general relativity.	2	1	-	1	-	1	-	1	-	-	2	2	2	1	2
56	(MC440)	MC440.1	CO1: Identify and analyze the characteristics of a good estimator.	3	2	1	1	1	1	1	1	-	-	-	2	3	2	-
	Statistical	MC440.2	CO2: Design and test statistical hypothesis associated with the analysis of social/environmental/industrial	3	2	2	1	1	-	-	1	1	1	1	-	2	2	1
	Inference		problems.															
	(B.Tech.	MC440.3	CO3: Apply inferences and tests for investigation of problems and provide valid conclusion for management of	2	2	2	1	1	-	1	2	1	-	-	1	2	3	2
	Semester-8)		resources and finance leading to betterment of society in general.															
		MC440.4	CO4: Infer and provide technical solutions to the problems in industry and society by working as team member	2	2	2	1	3	1	1	1	-	-	-	2	2	3	2
			with social scientists/technological experts.								1							
		MC440.5	CO5: Analyse the random processes using the skills acquired in higher study and research.	2	1	-	1	-	1	-	-	-	-	2	2	1	2	3