माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(Declared under Distinct Category by Ministry of Education, Government of India)
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Department : Department of Engineering Mathematics and Computing

Year				July- 2023- June-2024	CO Attainment			CO-PO Matrix														
				Course Outcome	Direct % Attainment	Indirect % Attainment	Total % Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
	Introduction to Computing (3250121)	CO1		Explain core components of computing and linkage between them	3.0	3.0	3.00	2	3	3	2	2		2					1	1	2
		CO2		Introduce role of operating system	3.0	2.0	3.00	2	2	2	2	2		3					2	2	2
		CO3		Discuss the role of computing in real world applications	3.0	2.0	3.00	2	2	3	3	2							1	2	2
		CO4		Implement networking corresponding in file handling and security using linux	3.0	1.5	2.00	2	3	3	3	2								2	2

Semester 1

Course	CO	Description				PO/PSO Mapping
	CO5	Apply the computing techniques in startups for socio-economic progress	3.0	1.5	3.00	2 2 2 2 2 · · · · · · · 2 2

Introduction to Computing (3250121)

Course	CO	Description				PO/PSO Mapping
Introduction to Computer Programming (3250122)	CO1	Discuss computational methods and computers would be useful	3.0	1.5	2.0	3 3 3 · · · · · 1 · · · 2
	CO2	Describe the basic principles of imperative and structural programming	3.0	1.5	3.0	3 3 3 · · · · · 1 · · · 2
	CO3	Test a pseudo-code and flowchart for a given problem	2.0	1.5	2.0	3 3 3 · · · · · 2 · · · 2
	CO4	Apply concept of array and pointer in programming	2.0	1.5	2.0	3 3 3 · · · · · 2 · · · 2
	CO5	Design the structure and function to test their programme	3.0	1.5	3.0	3 3 3 · · · · · 2 · · · 2

Introduction to Computer Programming (3250122)

Course	CO	Description				PO/PSO Mapping
Statistical Techniques (3250123)	CO1	Determine the central of tendency, skewness and kurtosis	3.0	1.5	2.0	3 3 3 · · · · · 1 1 1 2 · 2
	CO2	Describe the theory of probability and its distributions	3.0	1.5	3.0	3 3 · 2 · 2 · · 2 1 1 2 1
	CO3	Compare the correlation and regression analysis	3.0	1.5	3.0	3 3 · · · · · · 1 1 1
	CO4	Analyze the test of hypothesis	3.0	1.5	3.0	3 · 3 3 2 · · · 1 1 1
	CO5	Compare the coefficient of association, colligation and degree of association of data	3.0	1.5	3.0	3 3 · 3 2 · · · 1 1 1 1 1 · 2

Statistical Techniques (3250123)

Course	CO	Description				PO/PSO Mapping
Element of Calculus (3250124)	CO1	Determine the maxima and minimum of function for one and two variables	3.0	1.5	2.0	1 1 1 1 · 3 3 3 3 3 · · 2
	CO2	Describe derivatives concepts using different techniques	3.0	1.5	3.0	1 1 1 1 · 3 3 3 3 3 · · 2
	CO3	Discuss integral calculus	3.0	1.5	2.0	1 1 1 1 · 3 3 3 3 3 · · 2
	CO4	Obtain the volume and area of surface by using multiple integrals	3.0	1.5	3.0	1 1 1 1 · 3 3 3 3 3 · · 2
	CO5	Evaluate the gamma and beta Function	3.0	1.5	3.0	1 1 1 1 · 3 3 3 3 3 · · 2

Element of Calculus (3250124)

Course	CO	Description				PO/PSO Mapping
Digital Logic Design (3250125)	CO1	Describe various energy resources, their conversion to electrical power	3.0	2.6	2.9	3 3 2 3 3 · · 1 1 1 · 1 2 2
	CO2	Summarize national/international power status and renewable power	2.9	2.6	2.8	3 3 3 3 3 1 2 1 1 1 · 1 2 2
	CO3	Observe the impact of pollution on the ecosystem and control policies	3.0	2.5	2.9	3 3 3 3 3 1 2 1 1 1 · 1 2 2
	CO4	Use the concepts of ecosystems and their conservation.	2.6	2.5	2.6	3 3 3 3 3 1 · 1 1 1 · 1 2 2
	CO5	Solve problems of society in a sustainable and ethical manner	3.0	2.8	3.0	3 3 3 3 3 · · 1 1 1 · 1

Digital Logic Design (3250125)

Semester 2

Course	CO	Description				PO/PSO Mapping
Computer Organization and Logic Design(325 0221)	CO1	Describe the architecture of central processing unit.	3.0	2.2	2.8	1 1 1 · · 3 3 3 3 3 · · 2
	CO2	Analyze different number systems and their operations	3.0	2.1	2.8	· · · · 1 3 3 3 3 3 · · 2
	CO3	Test CPU architecture	3.0	2.0	2.8	· 1 1 1 · 3 3 3 3 3 · · 2
	CO4	Discuss parallel processing, pipelining and inter processor	3.0	1.9	2.8	· · · · · 3 3 3 3 3 · · 2
	CO5	Explain I/O and memory organization	3.0	1.9	2.8	· · · · · 3 3 3 3 3 · · 2

Computer Organization and Logic Design(3250221)

Course	CO	Description				PO/PSO Mapping
Differential Equations (3250222)	CO1	Determine the analytic solution of ordinary differential equations	2.1	2.0	2.1	2 2 2 2 · 1 · · 1 · · · 2
	CO2	Compute the solution of ordinary differential equations with constant	2.2	2.0	2.16	2 2 2 2 · 1 · · 1 · · · 2
	CO3	Solve second and higher order differential equations	2.6	2.1	2.5	2 2 2 2 · 1 · · 2 · · · 2
	CO4	Formulate the partial differential equations	2.3	1.9	2.2	2 2 2 2 · 1 · · 2 · · · 2
	CO5	Evaluate the partial differential equations of higher order with its	2.3	2.0	2.2	2 2 2 2 · 1 · · 2 · · · 2

Differential Equations (3250222)

Course	CO	Description				PO/PSO Mapping
Object Oriented Methodology and Programming with C++(3250223)	CO1	Discuss the classes & objects and their significance	3.0	2.2	2.8	· · · · · 3 2 2 2 2 2 · 2
	CO2	Explain the benefits of object oriented design	3.0	2.1	2.8	· · · · · 3 2 2 2 2 2 · 2
	CO3	Build C++ classes using appropriate features of object oriented	3.0	2.0	2.8	· · · · · 3 2 2 2 3 2 · 2
	CO4	Analyze the utilization of inheritance and polymorphism to solve	3.0	2.1	2.8	· · · · · 2 2 2 2 3 2 · 2
	CO5	Apply object orient programming concepts for real world problem	3.0	1.9	2.8	· · · · · 3 2 2 2 2 2 · 2

Object Oriented Methodology and Programming with C++(3250223)

Course	CO	Description				PO/PSO Mapping
Linear Algebra (3250224)	CO1	Discuss the matrix and its properties	3.0	2.0	2.8	2 · · 2 3 · · 2 2 2 · 2 2
	CO2	Formulate various algebraic structures	3.0	2.3	2.9	2 · · 2 3 · · 2 2 2 · 2 2
	CO3	Describe the fundamental of vector space	3.0	2.5	2.9	2 · · 2 3 · · 2 2 2 · 2 2
	CO4	Apply linear transformation in practical applications	3.0	2.5	2.9	2 · · 2 3 · · 3 3 2 · 2 2
	CO5	Apply the inner product spaces in engineering applications	3.0	2.1	2.8	2 · · 2 3 · · 3 3 2 · 2 2

Linear Algebra (3250224)

Course	CO	Description				PO/PSO Mapping
Simulation Modeling and Analysis (3250225)	CO1	Acquire the knowledge Simulation	3.0	2.2	2.8	2 2 2 · · · · 1 2 2 2 2 1
	CO2	Analyze the discrete and continuous Simulation Models	3.0	2.1	2.8	2 2 2 · · · · 1 2 2 2 2 1
	CO3	Evaluate random generation	3.0	2.0	2.8	2 2 2 · · · · 1 2 2 2 2 1
	CO4	Interpret the queueing models for single & multiple servers	3.0	2.5	2.9	2 · · 2 3 · · 3 3 2 · 2 2
	CO5	Determine the real-world problem of simulation	3.0	2.1	2.8	2 2 2 · · · · 1 2 2 2 2 1

Simulation Modeling and Analysis (3250225)

Course	CO	Description				PO/PSO Mapping
Stochastics Process & Mathematics fanniace (3250321)	CO1	1. Define and describe market models, growth and decay curve	3.0	2.2	2.8	3 · · 2 · 3 · 2 2 2
	CO2	2. Analyze free risk assets in financial sector	3.0	2.2	2.8	3 · · 2 · 3 2 2 2 2 · 3
	CO3	Deal with the market risk measurement and management	3.0	1.5	2.7	3 · · 2 · · 2 3 2 2 2 · 3
	CO4	Employ discrete market models and able to manage portfolio.	3.0	1.8	2.8	2 · · 2 · · · 2 3 3 2 · 3
	CO5	Explore stochastic differential equations	2.0	2.5	2.1	2 · · 2 · · · 2 3 3 2 · 3

Stochastics Process & Mathematics fanniace (3250321)

Course	CO	Description				PO/PSO Mapping
Discrete Mathematical Structures (3250322)	CO1	Discuss set theory and its application	3.0	2.2	2.8	2 2 2 · · · · 2 2 2 · 2
	CO2	Explain the concept of poset and Lattice	3.0	2.2	2.8	2 2 2 · · · · 2 2 2 · 2
	CO3	Describe graph theory and create algorithm for finding shortest path	3.0	1.5	2.7	2 2 2 · · · · 2 2 2 · 2
	CO4	Design algorithm for finding spanning tree	3.0	1.8	2.8	2 2 2 · · · · 2 2 2 · 2
	CO5	Solve the homogenous and non homogenous recurrence relation	3.0	2.0	2.8	2 2 2 · · · · 2 2 2 · 2

Discrete Mathematical Structures (3250322)

Semester 3

Operating System Concepts (3250323)

CO	Description				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss the basic concept of operating systems	3.0	2.2	2.8	3	2	2						2	2	2		2		
CO2	Understanding memory management	3.0	2.2	2.8	3	2	2						2	2	2		2		
CO3	Explain deadlocks in inter processing communication	3.0	1.5	2.7	3	2	2						2	2	2		2		
CO4	Measure the performance of various scheduling/allocation	3.0	1.8	2.8	3	2	2						2	2	2		2		
CO5	Compare performance measure of operating system	3.0	2.0	2.8	3	2	2						2	2	2		2		

Operating System Concepts (3250323)

Data Structure and Algorithms (3250324)

CO	Description				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Describe the basics of algorithms and their performance criteria's	2.7	1.9	2.5	3	3	2	3	3		1						2	2	1
CO2	Explain the working of linear/Non Linear data structures	2.9	1.8	2.7	3	3	3	3	2			2	3	1	2				1
CO3	Detect the appropriate data structure to solve specific problems	3.0	1.8	2.8	2	3	3	2	1	1		2	1	1	2	1			2
CO4	Analyze the performance of various data structures & their	3.0	1.9	2.8	3	3	3	3					1					1	1
CO5	Evaluate the time/space complexities of various data structures &	3.0	1.9	2.8	3	3	2	3					1	1	1			1	2

Data Structure and Algorithms (3250324)

Numerical Techniques (3250325)

CO	Description				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss the concepts of algebraic & transcendental equations	3.0	2.2	2.8	3	3		2					3	2	2	2			
CO2	Explain the finite difference operators	3.0	2.2	2.8	3	3		2				3	2	2	2	2	3		
CO3	Solve numerical integration and differentiation	3.0	1.5	2.7	3	3		2				2	3	2	2	2	3		
CO4	Find the problems of ordinary differential equation	3.0	1.8	2.8	3	3		2					2	3	3	2	3		
CO5	Compute the solution of Partial differential equations	2.0	2.5	2.1	2	2		2					2	3	3	2	3		

Numerical Techniques (3250325)

Engineering Physics (3000001)

CO	Description				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Classify living organisms on the basis of different properties and their	3.0	1.9	2.8	3	3	3												3
CO2	Explain mechanism of various physiological processes of human	2.6	1.8	2.4	3	3	3												3
CO3	Explain functions and industrial application of various bio-molecules	3.0	1.8	2.8	2	3	3												2
CO4	Discuss the basics and Industrial applications of microbiology and	3.0	1.9	2.8	2	3	3												2
CO5	Describe basic concepts of genetics and molecular biology and their	1.4	1.9	1.5	2	2	2												2

Engineering Physics (3000001)

Semester 4

Transform and Vector Calculus (3250401)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Solve complex mathematical problems using Fourier series and	3.0	2.0	2.8	3	2							3	2	2			2	
CO2	Evaluate differential equations using Laplace transform	3.0	2.4	2.9	3	2							3	2	2			2	
CO3	Solve difference equations using Z-transform	3.0	2.1	2.8	2	2							3	2	2			2	
CO4	Decompose computational problems using Wavelet analysis.	3.0	1.9	2.8	2	2							3	2	2			2	
CO5	Apply vector calculus to find the solutions of engineering problems	3.0	2.1	2.8	2	2							3	2	2			2	

Transform and Vector Calculus (3250401)

Database Management Systems and SQL (3250402)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Solve complex mathematical problems using Fourier series and	3.0	2.3	2.9	3	3	3	3	3				1	1	1	2	2	3	3
CO2	Evaluate differential equations using Laplace transform	2.9	2.0	2.7	3	3	3	3	3				1	1	1		2	3	2
CO3	Solve difference equations using Z-transform	2.3	2.1	2.3	3	3	3	2	2				1	1	1	2	2	3	1
CO4	Decompose computational problems using Wavelet analysis.	3.0	2.0	2.8	3	3	3	2	3	1			1	1	1	2	2	3	3
CO5	Apply vector calculus to find the solutions of engineering problems	3.0	1.9	2.8	3	3	3	3	3	2			1	1	1	1	2	3	3

Database Management Systems and SQL (3250402)

Theory of Computation (3250403)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Explain the basic concepts of finite automata theory & languages	1.2	2.4	1.4	3	3	3	3	2	2	2	2	1	3	1			1	2
CO2	Discuss the concept of push down automata	1.6	2.1	1.7	3	3	3	2	2	2	3	3	1	2		2	1	1	1
CO3	Analyze the grammar, its types, simplification and normal form	2.6	1.9	2.5	3	3	3	3	2		3		3		1	1	1	1	
CO4	complexity	2.8	2.0	2.6	3	3	3	3	2	1		3		3		1	1	1	
CO5	Construct abstract models of computing and check their power to	2.1	2.0	2.1	3	3	3	3	2	2	1	2	1	2		2	1	1	2

Theory of Computation (3250403)

Design and Analysis of Algorithms (250404)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1.6	2.2	1.7	3	3	3	1	2	3								3	
CO2	Apply DBMS techniques to solve real time problem	2.3	2.3	2.3	3	3	3	1	2	2								3	2
CO3	Explain functional dependencies and normalization techniques	1.9	2.0	1.9	3	2	3	1	2	2				2				3	
CO4	Evaluate the methods of transaction, concurrency and recovery	2.2	2.0	2.2	3				2	2	2		2					2	
CO5	Apply DBMS techniques to solve real time problem	2.6	2.1	2.5	3			2	2								2	2	2

Design and Analysis of Algorithms (250404)

Number Theory and Cryptography (3250405)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss the properties of number theory and transcendental numbers	3.0	2.2	2.8	2				2	3								2	
CO2	Describe the divisibility and related algorithms, factorization and	3.0	2.4	2.9	2				2	3								2	
CO3	Determine arithmetical functions, distribution of primes and	3.0	2.0	2.8	2				2	3								2	
CO4	Compare cryptography techniques for security problems	3.0	2.0	2.8	2				2	3								2	
CO5	Evaluate the public key cryptosystems	3.0	2.1	2.8	2				2	3								2	

Number Theory and Cryptography (3250405)

Project Management and Financing (1000005)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss the attributes of project and its different phases	2.2	2.2	2.2	3	2			2			2	2	1		2		2	
CO2	Develop the project network based on work breakdown structure	1.5	2.3	1.7	3	2			2							2		2	
CO3	Analyze the project network and make decide the various alternates	1.6	2.0	1.6	2	2	1									2		2	1
CO4	Evaluate the optimum cost of project for assigned deadlines	2.2	2.0	2.2	3	3	1	1				2				2		2	
CO5	Apply techniques to arrange the finances to complete it within	1.5	2.1	1.6	3	3	2	1	2							2		2	1	2

Project Management and Financing (1000005)

Engerineering Chemistry (3000002)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Know the rich Indian traditions and the Indian constitution	3.0	2.2	2.8	3	3	3	3	1									2	2
CO2	Appraise the utility and significance of tradition and its applicability in	2.9	2.1	2.7	3	3	3	3	1									2	2
CO3	Employ the knowledge of the constitutional norms as laid in the	3.0	2.0	2.8	3	3	3	3	1									2	2
CO4	Create a better society and living standards for themselves as well as	2.9	1.9	2.7	3	3	3	3	1									2	2
CO5	Recognize the basic concepts of ethics and morality pertaining to and practices	2.9	1.9	2.7	3	3	3	3	1									2	2
CO6		0.9	1.9	1.1	3	3	3	3	1									2	2

Engerineering Chemistry (3000002)

Semester 5

Computer Networks (250501)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss the computer network and their uses	3.0	1.8	2.8	3	3	3	2	2	3	3		2	2	3	2	3	3	
CO2	Describe network layers	1.4	1.2	1.4	3	3	3	2	2	2	3		2	2	3	2	3	3	
CO3	Finding deficiencies in existing protocols and then go onto formulate	0.9	1.2	1.0	3	3	3	2	2	3	3		2	2	3	2	3	3	
CO4	Analyze the topological and routing strategies for an IP based	2.3	1.8	2.2	3	3	3	2	2	2	3		2	2	3	2	3	3	
CO5	Solve the issues of transport and application layers	3.0	1.2	2.6	3	3	3	2	2	2	3		2	2	3	2	3	3	

Computer Networks (250501)

Real and Complex Analysis (250502)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Describe concept of real number system and their applications	3.0	2.4	3	2	2	3	2	2	2	2				2	3			2
CO2	Analyze various properties of continuity and uniform continuity	2.9	2.1	3	2	2	3	3	2	2	2				2	3			2
CO3	Apply concepts of Riemann integral to solve engineering problems	3.0	1.5	3	3	2	3	2	2	2	2		2			3			2
CO4	Use the applications of complex valued function in real world	2.9	1.6	3	2		3		2	2	3		2	2		2			2
CO5	Classify various forms of singularities of complex valued functions and	2.9	2.0	3	2		3	2	2		3		2	2		2			2

Real and Complex Analysis (250502)

Software Engineering (250503)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Explain the various fundamental concepts of software engineering	2.8	2.2	3	3			2			3				2			2	
CO2	Describe the concepts of software design and analysis	2.8	2.4	3	3	2	3				3	2			2		3		
CO3	Compare the techniques for software project management and	3.0	2.3	3	3	3	2				2	3			3		3		
CO4	Apply appropriate model for real life software project	2.6	2.1	2	3			3			2				2				
CO5	Test the software through different approaches	3.0	2.2	3	3	2	1					2					3		
		2.6	2.2	2	3	2	2					2					3		

Software Engineering (250503)

Data Science using Python (250504)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Discuss data science techniques	3.0	1.8	3				2		3		2	2						
CO2	Apply different tool for data science using python	1.4	1.2	1				2					3	3					
CO3	Use visualization techniques to solve real world problems	1.9	1.2	2				2			2	2					2	2
CO4	Apply exploratory data analysis for data science methods	2.3	1.8	2				2		2			3					1
CO5	Implement data science techniques for solving real world problems	3.0	1.2	3				2		2		2						

Data Science using Python (250504)

Optimization Techniques (250505)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Determine the solution of linear programming problem	2.2	2.2	2.2	3	3	3		2	2				2				
CO2	Solve non linear programming problem using optimization techniques	2.4	2.2	2.4	2	2	3		2	2				2				
CO3	Find the optimal solution using PERT/CPM	2.3	2.1	2.3	2	3	3		2	2				2				
CO4	Discuss the concept of game theory	2.1	2.2	2.1	2	3	3		2	2				2				
CO5	Evaluate the different models of inventory	2.3	2.0	2.2	2	3	2		2	2				2				
		2.3	2.1	2.2	3	2	3		2	2				2				

Optimization Techniques (250505)

Disaster Management (3000006)

CO	Course Outcome				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Identify disaster prevention and mitigation approaches	2.4	2.2	2.4	3	3	3		2	2				2				
CO2	Classify global and national disasters, their trends and profiles	3.0	2.2	2.8	2	2	3		2	2				2				
CO3	Determine the impacts of various disasters	2.3	2.1	2.3	2	3	3		2	2				2				

Sem	Course	CO	Course Outcome	Avg1	Avg2	Avg3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Disaster Management (100...)	CO4	Apply Disaster Risk Reduction in management	3.0	2.2	2.8	2	3	3		2	2							2			
		CO5	Infer the linkage between disasters, environment and development	2.3	2.0	2.2	2	3	3		2	2							2			
		CO6		2.3	2.1	2.2	3	2	3		2	2							2			
			Disaster Management (1000006)																			
	Computer Graphics (250601)	CO1	Explain interactive computer graphics and display devices	3.0	2.2	2.8	2	2	2							3	3	3	3		3	3
		CO2	Describe line generations, circle generation, curve generation and	3.0	2.2	2.8	2	2	2							3	3	3	3		3	3
		CO3	Apply various 2-dimensional and 3-dimensional transformations and	2.3	2.1	2.3	2	2	2							3	3	3	3		3	3
		CO3	Classify methods of image clipping and algorithms for line and																			
		CO4	Choose appropriate filling algorithms, hidden surface elimination																			
		CO5	Discuss color models, shading methods, animation in digital image	3.0	2.2	2.8										3	3	3	3		3	3
			Computer Graphics (250601)																			
	Compiler Design (250602)	CO1	Explain the concepts of finite automata and context-free grammar	2.9	2.1	2.7	2	2	2							3	3	3	3		3	3
		CO2	Discuss the concept of working of compiler	2.5	2.2	2.4	2	2	2							3	3	3	3		3	3
		CO3	Compare parsing techniques	1.6	2.2	1.7	2	2	2							3	3	3	3		3	3
		CO4	Analyze code generation and code optimization techniques																			
		CO5	Apply different tools and techniques for designing a compiler	1.5	2.1	1.6										3	3	3	3		3	3
			Compiler Design (250602)																			
Semester 6	Artificial Intelligence & Machine Learning (250603)	CO1	Describes the basics of artificial intelligence &machine learning	2.3	2.1	2.3	3		2										2			
		CO2	Compare techniques for search and processing in artificial intelligence	2.3	2.2	2.3	2	2						2							2	
		CO3	Identify types of machine learning problems and techniques	2.3	2.2	2.3					2	3										
		CO4	Analysis techniques in artificial intelligence& machine learning	2.3	2.1	2.3	2	2						3								
		CO5	Apply artificial intelligence and machine learning techniques to solve	2.1	2.0	2.1		3	2												2	
		CO6	Build artificial intelligence enabled intelligent systems for solving real	2.2	2.0	2.2													2			
			Artificial Intelligence & Machine Learning (250603)																			
	Intellectual Property Rights (IPR) (1000007)	CO1	Imbibe the knowledge of Intellectual Property and its protection	3.0	2.2	2.8										2	2	3	2			1
		CO2	apply the knowledge of IPR for professional development	2.3	2.1	2.3										2	2	3	2			1
		CO3	develop a platform for protection and compliance of Intellectual	3.0	2.2	2.8										2	2	3	2			1
		CO4	create awareness amidst academia and industry of IPR and Copyright	2.3	2.0	2.2										2	2	3	2	3		1
		CO5	deliver the purpose and function of IPR and patenting.	2.3	2.1	2.2										2	2	3	2			1
			Intellectual Property Rights (IPR) (1000007)																			
Semester 7	Engineering Reliability (250731)	CO1	Discuss the reliability of the system	2.3	2.1	2.3	3	3	3	2	2	3	3			2	2	3	2		3	2
		CO2	Evaluation of measure for system reliability	2.9	2.1	2.7	3	3	3	2	2	2	3			2	2	3	2			2
		CO3	Apply Markov process to carried out system reliability	2.5	2.2	2.4	3	3	3	2	2	3	3			2	2	3	2			2
		CO4	Find maintainability and availability of the system	2.1	2.2	2.1	3	3	3	2	2	2	3			2	2	3	2			2
		CO5	Find maintainability and availability of the system	2.2	2.1	2.2	3	3	3	2	2	2	3			2	2	3	2			2
			Engineering Reliability (250731)																			
	Distributed Computing (250732)	CO1	Discuss the concepts related to distributed system technologies	2.4	1.9	2.4	3	3	3		2	2					2					
		CO2	Describe the core architectural aspects of distributed systems	2.1	2.2	2.8	2	2	3		2	2					2					
		CO3	Explain the resources in a distributed system are managed by	2.3	2.4	2.3	2	3	3		2	2					2					
		CO4	Apply the concept distributed file system and distributed shared	3.0	2.2	2.8	2	3	3		2	2					2					
		CO5	Compare various distributed system algorithms for solving real world	2.3	2.4	2.2	2	3	3		2	2					2					
		CO6		2.3	2.6	2.2	3	2	3		2	2					2					
			Distributed Computing (250732)																			
Semester 8	130801 : Internship/ Project	CO 1	Formulate the real world problems.	2.2	2.3	2.2	3											3				
		CO 2	Express the technical ideas, strategies & methodologies.	2.2	2.3	2.2	3	2						2				2				
		CO 3	Utilize the new tools, algorithms, techniques to obtain solution of the	2.2	2.3	2.2		3					3	3				3	2		3	
		CO 4	Test & validate the developed prototype/results.	2.2	2.3	2.2						3	2					2			2	
		CO 5	Write a project report.	2.2	2.3	2.2	3									2		2				
		CO 6	Prepare oral demonstrations.	2.2	2.3	2.2	2	3	2			2				3		2	3	3	2	
			130801 : Internship/ Project																			
	130802 : Professional Development	CO 1	Develop intellectual curiosity, competency and skills	3.0	2.2	2.8			2	3	3				2	2	3	2				
		CO 2	Develop critical thinking, creativity and effective communication	2.1	2.4	2.2			3	2	3				2	2	3	2				
		CO 3	Display professionalism and ownership of professional growth and learning	2.6	2.3	2.5			3	3	3				2	2	3	2				
			130802 : Professional Development																			