2021-2022

21MAU01	CORE - I :CLASSICAL ALGEBRA	SEMESTER	LEVEL
CO 1	recall the concepts of Binomial, Exponential, Logarithmic series, Convergence and Divergence of series, multiple roots of an equation.		K1
CO 2	express the summation of series, Theory of equations, Convergence and Divergence of series.		K2
CO 3	apply Binomial, Exponential, Logarithmic series for finding summation of series, different types of methods to find convergence and divergence of series and the roots of an equation.	I	K3
CO 4	analyze the Binomial, Exponential, Logarithmic, convergence and divergence of series and roots of an equation.		K4
CO 5	evaluate the multiple roots and summation of series the problems by using different types of methods.		K5
21MAU02	CORE - II :DIFFERENTIAL CALCULUS	SEMESTER	LEVEL
CO 1	remember all the formulae in differentiation		K1
CO 2	explain the differentiation of derivatives, successive differentiation, maxima and minima, partial differentiation and curvature		K2
CO 3	apply various differential formulae for solving successive differentiation, maxima and minima, partial differentiation and curvature	I	K3
CO 4	analyze the properties of derivatives, successive differentiation, maxima and minima, partial differentiation and curvature		K4
CO 5	evaluate the two variable and three variable functions by using derivatives, successive differentiation, maxima and minima, partial differentiation and curvature		K5

21FCU01	FOUNDATION - I : ENVIRONMENTAL STUDIES	SEMESTER	LEVEL
CO 1	Define environment, ecosystem, biodiversity, environmental pollution and social issues.		K1
CO 2	Explain the natural resources, types of ecosystem, geographical classification of India, causes of environmental pollution and the problems related to the society.		K2
CO 3	Identify the information related to environment and the resources to protect it.	I	K3
CO 4	Analyze the classification of natural resources, energy flow in the ecosystem, threats to biodiversity, disaster management and the role of information technology in environment and human health.		K4
CO 5	Assess the environmental issues with a focus on sustainability.		K5
21MAU04	CORE- IV : ANALYTICAL GEOMETRY	SEMESTER	LEVEL
CO 1	recall the definitions based on conic, Straight line, Sphere, cone, cylinder and conicoid.		K1
CO 2	express the concepts of conic, Straight line, Sphere, cone, cylinder and conicoid.		K2
CO 3	apply the various concepts of straight lines, conic, sphere, cone, cylinder and conicoid to determine the respective equations.	II	K3
CO 4	analyze the concepts of two dimensional and three dimensional Analytical Geometry.		K4
CO 5	evaluate the equation of a conic, sphere, cone, cylinder and shortest distance between two straight lines.		K5

21MAU05	CORE- V : INTEGRAL CALCULUS	SEMESTER	LEVEL
CO 1	recall the basic definitions of Integration	II	K1
CO 2	explain the integration of rational, irrational, trigonometric and Improper integrals		K2
CO 3	apply various integral formulae to solve rational, irrational, trigonometric and Improper integrals		K3
CO 4	analyze the properties of Methods of integration, integration of rational- irrational- trigonometric functions, Beta and Gama functions and convergence/divergence of integrals		K4
CO 5	evaluate double and triple integrals by using Methods of integration, Integration of rational- irrational- trigonometric functions and Improper integrals.		K5
21FCU02	FOUNDATION - II : YOGA AND ETHICS	SEMESTER	LEVEL
CO 1	recollect the basic terminologies in yoga and value education	II	K1
CO 2	demonstrate the importance of yoga, mental exercises, principles of life and components of values.		K2
CO 3	apply the techniques of dynamic & mental exercises and philosophical values in real life		K3
CO 4	classify the different types of asanas, stages of mind, analysis of thought, ethical values and social values.		K4
CO 5	evaluate how the yoga and value education make a person strong both physically and mentally		K5

21MAU08	CORE - VIII : DIFFERENTIALEQUATIONS AND LAPLACE TRANSFORMS	SEMESTER	LEVEL
CO 1	recall the basic concepts of ordinary, partial, linear differential equations and Laplace transforms.		K1
CO 2	identify the solutions of ordinary, partial differential equations, Laplace and inverse Laplace transformations.		K2
CO 3	apply Clairaut's form, Laplace and inverse Laplace transforms, direct integration to solve Differential Equations.	III	K3
CO 4	analyze the difference between Laplace and inverse Laplace transforms, ordinary and partial differential equations.		K4
CO 5	evaluate the solutions for ordinary, partial, linear differential equations and Laplace transforms.		K5
21MAU09	CORE - IX : TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	SEMESTER	LEVEL
CO 1	recall the basic concepts of cosines and sines of multiples of θ, logarithmic of complex quantity, scalar and vector fields, integration of vectors and periodic functions		K1
CO 2	illustrate the concepts of summation of series using binomial, exponential and logarithmic series theorem, differentiation of vectors, line integral and surface integral and Fourier series of periodicity 2π		K2
CO 3	apply C+iS method, Green's theorem, Gauss divergence theorem, Stoke's theorem and Half range series for finding summation of series and values of integrals.	III	K3
CO 4	analyze the relation between trigonometric series and hyperbolic series, Grogory's series and gradient, divergent, curl, also Gauss theorem and Stoke's theorem, even and odd function		K4
CO 5	evaluate the integrals using Gauss divergence theorem, Stoke's theorem and Fourier series of periodicity 2π using Dirichlet conditions		K5

21MAU10	CORE – X ALLIED – II: STATISTICS - I	SEMESTER	LEVEL
CO 1	recall the definitions of random variable, mathematical expectation, transformation of variable, measures of central tendency, correlation and regression analysis.	III	K1
CO 2	explain the concepts of random variable, mathematical expectation, transformation of variable, measures of central tendency, correlation and regression analysis.		K2
CO 3	interpret the concepts of random variable, mathematical expectation, transformation of variable, measures of central tendency, correlation and regression analysis.		K3
CO 4	analyze the properties of mathematical expectation, transformation of variable, relationship among mean, median, mode, correlation coefficient and regression equation.		K4
CO 5	evaluate the problems based on one and two dimensional probability mass and density functions, measures of central tendency, correlation and predict the regression equation.		K5
21AEU01	ABILITY ENHANCEMENT- I : INFORMATION SECURITY	SEMESTER	LEVEL
CO1	Recall the fundamental concepts of Information Security, Risk and Security policies	III	K1
CO2	Discuss the concepts of Risks, vulnerabilities, ethical and privacy issues		K2
CO3	Apply the ideas in security planning and construct the policies		K3
CO4	Categorizethe Privacy, Ethical Issues, Laws, Software Issues and Crimes		K4
CO5	Summarize Cryptography, cipher text and threats in information security		K5

21NMU01A	NON- MAJOR ELECTIVE : INDIAN WOMEN AND SOCIETY	SEMESTER	LEVEL
CO1	know women status in Indian society as an academic discipline		K1
CO2	interpret the various roles of women, challenges and issues faced by them in the society		K2
CO3	find out solutions to their legal issues and product themselves from the violence against women emphasize on women entrepreneurship for their empowerment	III	K3
CO4	critically analyze the lifestyle and challenges of women		K4
CO5	discuss the importance of women health and issues related to women in general		K5
21MAU11	CORE - XI : MECHANICS	SEMESTER	LEVEL
CO 1	recall the concepts of fundamental laws, moments, coplanar forces, projectiles and equations of motion of central orbits.		K1
CO 2	explain the different types of laws, forces, radial and transverse components of orbits, height, time and range of a projectile, direct and oblique impact.		K2
CO 3	apply the principles of static equilibrium, projectiles, conservation of momentum, reduction of forces to solve simple real life problems.	IV	K3
CO 4	analyze the equilibrium of a particle, projectiles, radial and transverse components of orbits and impact of elastic bodies.		K4
CO 5	evaluate two fold problems in central orbits, magnitude and resultant of the forces, before and after impact velocities, range on an inclined plane.		K5

21MAU12	CORE - XII : NUMERICAL METHODS	SEMESTER	LEVEL
CO1	recall the basic concepts of linear algebraic and transcendental equations, simultaneous equations, Finite differences, Interpolation and Numerical Differentiation.	IV	K1
CO2	explain the procedure in finding the roots and values of an equation and the various difference tables to get the unknown values.		K2
CO3	apply various methods to solve the Algebraic, Transcendental, Simultaneous equations and using the difference table to get the unknown values.		K3
CO4	compare the various methods involved in solving Simultaneous equations and different kinds of difference operators		K4
CO5	evaluate the problems by using Bisection method, iterative method, Newton-Raphson method, direct and indirect method and Newton's formula.		K5
21MAU13	CORE – XIII ALLIED - II : STATISTICS - II	SEMESTER	LEVEL
CO1	recall the basic definitions and notations of probability distributions, estimation, sampling, confidence limit, test of hypothesis and test of significance.	IV	K1
CO2	identify the concepts of probability distributions, estimation, sampling, confidence limit, test of hypothesis and test of significance.		K2
CO3	classify the distribution, method of estimation, types of error and sampling.		K3
CO4	examine the problems based on probability distributions, estimation, test of hypothesis.		K4
CO5	evaluate the various types of distributions, estimation, limits, errors and significance.		K5

21SEMAU 01	SKILL ENHANCEMENT-I : INTERNET BASICS AND OFFICE AUTOMATION TOOLS - PRACTICAL	SEMESTER	LEVEL
CO1	Understand to work on gmail account, websites and MS Office		K1
CO2	Visualize various websites and presentations		K2
CO3	Apply different formats in documents, excel sheets, presentations and all the options in gmail account	IV	K3
CO4	Examine the programs based on gmail account, websites and MS Office		K4
CO5	Create a Gmail account, a document, a spread sheet and a presentation slide		K5
21AEU02	ABILITY ENHANCEMENT-II : CONSUMER RIGHTS	SEMESTER	LEVEL
CO1	Memorize the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards		K1
CO2	Explain the Consumer Protection Law in India		K2
CO3	Impart sound practical grounding about the practice of consumer law and the procedure followed	IV	K3
CO4	Evaluate the regulations and legal actions that helps to protect consumers		K4
CO5	Analyse the knowledge and skills needed for a career in this field		K5
21MAU14	CORE – XIV: ABSTRACT ALGEBRA	SEMESTER	LEVEL
CO1	recall the definition and basic ideas of Sets, Mappings, Groups, Rings and Ideals.		K1
CO2	interpret the basic concepts of Abstract Algebra.		K2
CO3	apply theoretical ideas of set theory and group theory for solving the simple problems .	V	K3
CO4	analyze the various theorems and lemmas for groups and Rings .		K4
CO5	evaluate the simple problems of set theory ,Group theory and ring theory.		K5

21MAU15	CORE - XV : REAL ANALYSIS - I	SEMESTER	LEVEL
CO1	Recall the definitions of upper bounds, lower bounds, countable sets, uncountable sets, open sets, closed sets and metric space.		K1
CO2	Explain the concepts of upper bounds, lower bounds, countable sets, uncountable sets, open sets, closed setsand metric space.		K2
CO3	Apply the concepts of limits for a vector – valued functions, finite and infinite sets for countable and uncountable sets, adherent points, accumulation points, interior points in open and closed sets.	V	K3
CO4	Analyze the concepts of countable sets, uncountable sets, open sets, closed sets, adherent points and accumulation points.		K4
CO5	Verify the concepts of upper bounds, lower bounds, supremum, infimum for real number system, relations, functions, Open balls, open sets, Closed sets, Adherent points, Accumulation points.		K5
21MAU16	CORE - XVI : COMPLEX ANALYSIS – I	SEMESTER	LEVEL
CO1	recall the basic concepts of complex functions, power series, simple mappings and complex integration.		K1
CO2	explain the differentiability and analyticity of complex functions, properties of complex function, convergence of power series, conformal mapping and contour integrals.		K2
CO3	apply the theorem and results to solve a variety of problems arising in analytic function.	V	K3
CO4	analyze the linear transformations, conditions for differentiability, conformal mapping and convergence of power series.		K4
CO5	evaluate integrals of analytic functions and the effect of various transformations and mappings.		K5

21MAU17A/ 21MAU17B/ 21MAU17C	CORE - XVII: INSTITUTIONAL TRAINING/ARTICLE SHIP TRAINING/MINI PROJECT	SEMESTER	LEVEL
CO1	recall the basic concepts related to the project work		K1
CO2	illustrate the knowledge about their principal areas of project work		K2
CO3	applying the relative notions in the respective areas and finding the results	V	K3
CO4	analyzing results with the existing results		K4
CO5	interpreting the results with suitable examples		K5
21MAU18A	CORE – XIX ELECTIVE – I: OPERATIONS RESEARCH-I	SEMESTER	LEVEL
CO1	outline the meaning, purpose and tools of Linear programming,Transportation, Assignment and Replacement models.		K1
CO2	explain the procedures for Linear programming, Transportation, Assignment and Replacement Theory.		K2
CO3	illustrate the methodologies to get the optimal solution and the period of replacement.	V	K3
CO4	measure the mathematical background of Linear programming, minimum Transportation cost, Assignment techniques and the mechanism behind the sudden failure of systems.		K4
CO5	evaluate different situations after the solution of Linear programming, Transportation, Assignment and Replacement models.		K5

21MAU18B	CORE – XIX ELECTIVE - I: APPLIED ALGEBRA - I	SEMESTER	LEVEL
CO1	recall the basic concepts of logical operations, relations and functions, graphs, lattices and Boolean functions.	V	K1
CO2	illustrate the properties of logical operations, relations and functions, graphs, lattices and Boolean functions.		K2
CO3	apply the various formulae to solve the rules of tautology, rules of inference, properties of functions, groups and Boolean algebra.		K3
CO4	examine the relation between tautology and contradiction, Subgroup and normal Subgroup.		K4
CO5	evaluate the problems based on logical expressions, relations, functions and Boolean algebra.		K5
21SEU02	SKILL ENHANCEMENT: II : LIFE SKILLS (Jeevan Kaushal)	SEMESTER	LEVEL
CO1	Identify the common communication problems, what good communication skills are and what they can do to improve their abilities	V	K1
CO2	Demonstrate communication through the digital media		K2
CO3	Prepare themselves to situations as an individual and as a team.		K3
CO4	Analyse various leadership models, strengths and abilities to create their leadership vision		K4
CO5	Appraise their potential as human beings and conduct themselves properly in the ways of theworld.		K5
21PEMAU 01	PROFICIENCY ENHANCEMENT: FINANCIAL MATHEMATICS(SELF STUDY)	SEMESTER	LEVEL
CO1	recall the basic definitions of simple interest and compound interest, Annuities, Mean Median, Mode, Transportation problem and Forecasting methods.	V	K1
CO2	explain the basic concepts of simple interest and compound interest, Annuities, Mean Median, Mode, Transportation problem and Forecasting methods.		K2
CO3	apply various formulae to solve the problems on simple interest and compound interest, Annuities, Mean Median, Mode,		K3

	Transportation problem and Forecasting methods.		
CO4	analyze the relations between Mean Median, Mode and Forecasting methods		K4
CO5	evaluate the problems on simple interest and compound interest, Annuities, Mean Median, Mode, Transportation problem and Forecasting methods.		K5
21MAU19	**CORE – XX: LINEAR ALGEBRA**	**SEMESTER**	**LEVEL**
CO1	recall the definitions and preliminaries in Vector space, Basis, Dual spaces, Inner product spaces.	VI	K1
CO2	explain the basic concepts of Linear Algebra		K2
CO3	apply conceptual ideas of Linear Algebra in simple problems.		K3
CO4	analyze the theorems and inequalities on linear functions and linear functional .		K4
CO5	evaluate the characterization of linear vectors, linear transformations and linear functional.		K5
21MAU20	**CORE – XXI: REAL ANALYSIS II**	**SEMESTER**	**LEVEL**
CO1	Recall the definitions of continuous functions, uniform continuous functions, connectedness, derivatives and monotonic functions.	VI	K1
CO2	explain the concepts of continuous functions, uniform continuous functions, connectedness, derivatives and monotonic functions.		K2
CO3	Apply the concepts of monotonic functions for the functions of bounded variations, total variations, Continuity and inverse images of open or closed sets.		K3
CO4	Analyze the concepts of continuity, uniform continuity, bounded variations, total variations.		K4
CO5	Evaluate the problems based on Chain Rule, Rolles Theorem, Mean Value Theorem and Fixed Point Theorem.		K5
21MAU21	**CORE – XXII: COMPLEX ANALYSIS – II**	**SEMESTER**	**LEVEL**
CO1	recall the results of Cauchy's theorem, Taylor's and Laurent's	VI	K1

	series, singularities, residues and meromorphic function.		
CO2	describe the results based on Cauchy's theorem, singularities, residues and meromorphic function.		K2
CO3	examine the singularities, poles and residues of complex function, types of real definite integrals.		K3
CO4	analyze the Taylor's and Laurent's expansion, behavior of a function at an isolated singularity and zeros and poles of meromorphic function.		K4
CO5	evaluate the series expansion and roots of analytic functions and the real definite integrals.		K5
21MAU22 A	**CORE – XXIII ELECTIVE - II: OPERATIONS RESEARCH-II**	**SEMESTER**	**LEVEL**
CO1	recall the basic concepts, models and statements of Integer programming, Sequencing, Dynamic Programming, level of information and NLPP		K1
CO2	express the procedures and steps for Integer programming, Sequencing, Dynamic Programming, Information theory and NLPP	VI	K2
CO3	examine the pure integer values, order of jobs, optimal solution and the level of information transmission		K3
CO4	inspect the Kuhn-Tucker conditions, optimality and the time to complete the jobs		K4
CO5	measure the mathematical arguments in a logical manner, Dynamic programming model and its applications in industry		K5
21MAU22 B	**CORE – XXIII ELECTIVE - II: APPLIED ALGEBRA -II**	**SEMESTER**	**LEVEL**
CO1	recall the basic definitions of grammars, operations, languages, graphs and trees.		K1
CO2	explain the concepts of grammars, operations, languages, graphs and trees.	VI	K2
CO3	identify the different types of grammar in formal languages and graphs.		K3
CO4	analyze the problems based on directed and undirected graphs, formal languages and context free languages.		K4

CO5	evaluate the problems on regular expression, closure operations, context free languages, graphs and trees.		K5
21MAU23 A	**CORE – XXIV ELECTIVE – III: GRAPH THEORY**	**SEMESTER**	**LEVEL**
CO1	recall fundamentals of Graph Theory		K1
CO2	demonstrate the concepts of graph theory		K2
CO3	apply algorithms and procedures to solve the problems.	VI	K3
CO4	analyze the contexts in simple, directed,bipartite , planar, Eulerian and Hamiltonian graphs		K4
CO5	evaluate the characterization of the graphs		K5
21MAU23 B	**CORE – XXIV ELECTIVE – III : FUZZY MATHEMATICS**	**SEMESTER**	**LEVEL**
CO1	recall the basic concepts of fuzzy algebra.		K1
CO2	Interpret the theoretical ideas of fuzzy algebra.		K2
CO3	apply the concepts of fuzzy subsets, fuzzy mappings, fuzzy relations, fuzzy logic, fuzzy groups, fuzzy rings on simple problems.	VI	K3
CO4	analyze fuzzy subgroup and Preimage of subgroupiod.		K4
CO5	evaluate the features of fuzzy subsets, fuzzy mappings, fuzzy relations, fuzzy logic, fuzzy groups, fuzzy rings.		K5
21SEMAU 03	**SKILL ENHANCEMENT – III :LATEX -PRACTICAL**	**SEMESTER**	**LEVEL**
CO1	Memorize the commands and environments provided in Latex		K1
CO2	Express the mathematical formulae, equations and tables		K2
CO3	Demonstrate various environments	VI	K3
CO4	Analyze different document types		K4
CO5	Construct different types of documents and latex beamer presentation		K5