Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

Course Outcomes

M.Sc. Mathematics

S.No	Course Code	Course Name	Course Outcomes
SEMESTER- I			
1.	23PMAC11	**Core Course –I:** Algebraic Structures	**CO1[K1]:** describe the fundamental theorems related to counting principles, solvable groups, modules and linear transformation **CO2[K2]:** explain the basic concepts of Sylow's theorem, solvable groups,canonical forms of linear transformations **CO3[K3]:** apply the abstract concepts to produce proofs of results that arise in the context of algebraic structures **CO4[K4]:** investigate the counting principle, structure of module, various canonical forms and types of linear transformations **CO5[K5]:** determine the class equation for finite groups, solvability of groups, similarity of linear transformations by reducing them to canonical forms, trace and transpose, real quadratic forms of linear transformations
2.	23PMAC12	**Core Course –II:**Real Analysis I	**CO1[K1]:** describe the basic terminologies of real number system **CO2[K2]:** explain the concept of total variation, Riemann- Steiltjes integral, infinite series,

				infinite functions and sequence of functions
			CO3[K3]:	apply the abstract concepts to produce proofs of results that arise inthe context of real analysis
			CO4[K4]:	examine the criterion for the existence of Riemann integrals, convergence of infinite series and sequence of functions
			CO5[K5]:	determine the total variation and Riemann integrals of bounded variation functions, sum of infinite series and limit of sequence functions
3.	23PMAC13	**Core Course –III:** Ordinary Differential Equations	**CO1[K1]:**	state the general form of linear ordinary differential equations of first order, second order and the method of finding solutions
			CO2[K2]:	find the solution of initial value problem
			CO3[K3]:	solve linear ordinary differential equations with constant coefficients, variable coefficients and with regular singular points
			CO4[K4]:	examine the existence and uniqueness of solutions of linear ordinary differential equations
			CO5[K5]:	determine an appropriate method to solve, linear ordinary differential equations
4.	23PMAO11	**Elective Courses Generic/ Discipline Specific - I:** Machine Learning and Artificial Intelligence	**CO1[K1]:**	describe the fundamental understanding of the history of artificial intelligence and its foundations
			CO2[K2]:	explain various techniques and algorithms of artificial intelligence used ingeneral problem solving
			CO3[K3]:	apply basic principles of artificial intelligence

				in finding solution of business problem
			CO4[K4]:	demonstrate proficiency in applying scientific method to models of machine learning
			CO5[K5]:	choose a model that best fits the available data
5.	23PMAO12	**Elective Courses Generic/ Discipline Specific - I:** Graph Theory and Applications	**CO1[K1]:**	describe the basic definitions and concepts of graph theory
			CO2[K2]:	find the solution of graph theoretical model using the given algorithm
			CO3[K3]:	apply the abstract concepts to produce proofs of results that arise inthe context of graph theory
			CO4[K4]:	investigate the characteristic features of various types of graphs
			CO5[K5]:	determine the efficient algorithm to solve graph optimisation problems
6.	23PMAO13	**Elective Courses Generic/ Discipline Specific - II:** Fuzzy Sets and their Applications	**CO1[K1]:**	state the basic definitions and terminologies of fuzzy set theory
			CO2[K2]:	explain the fundamental concepts in fuzzy set theory
			CO3[K3]:	apply the abstract concepts to produce proofs of results that arise inthe context of fuzzy set theory
			CO4[K4]:	investigate the different classes of fuzzy relations, operations on fuzzysets and fuzzy numbers
			CO5[K5]:	validate the axioms, assumptions, beliefs, arguments, deductions, hypothesis concerning fuzzy sets, fuzzy relations, fuzzy arithmetic

7.	23PMAO14	**Elective Courses Generic/ Discipline Specific – II:** Discrete Mathematics	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	describe the basic terminologies in inference theory, predictivecalculus, precedence grammar, switching circuits and computabilitytheory explain the rules, procedures, algorithms related to inference theory, predictive calculus, precedence grammar, switching circuits and computability theory solve problems related to inference theory, predictive calculus, switching circuits and computability theory investigate the properties of logical statements, precedence relations, acceptors and grammars validate the rules of inference, formulas involving quantifiers, algorithm for simple precedence grammars and fault detection
SEMESTER- II				
8.	23PMAC21	**Core Course –IV:** Advanced Algebra	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	describe the fundamental elements of extension fields and finite fields explain the basic concepts of extension fields and finite fields apply mathematical/ logical argument for proving criterions and characterizations of field theory and Galois Theory examine the characterizations of extension fields, finite fields, roots of polynomials and Galois group determine the extension of fields, solvability

				of groups, irreducibility of polynomials and Galois group of polynomials
9.	23PMAC22	**Core Course –V:** Real Analysis II	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	describe the basic terminologies in measure theory, integration of functions of a real variable, Fourier integrals, Multivariable differential calculus, extremum problems explain the fundamental concepts of measure on the real line, integration of functions of a real variable, Fourier integrals, multivariable differential calculus, extremum problems apply the abstract concepts to produce proofs of results that arise in the context of measure theory, integration and differentiation of functions of a real valued functions characterize measures on real line, Riemann and Lebesgue integrals, Fourier series and Fourier integrals, derivative of multivariable functions, implicit functions determine the measurability and integrability of functions, the convergence of Fourier series, Differentiability of multivariable functions, extrema of real valued functions of severable variable
10.	23PMAC23	**Core Course – VI:** Partial Differential Equations	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:**	identify the general form of partial differential equation explain the methods of solving partial differential equations apply the methods to solve Cauchy problem, initial value problem,boundary value

				problems, Neumann problem, Dirichlet problem, wave equations
			CO4[K4]:	examine the existence and uniqueness of the solution of partial differential equations
			CO5[K5]:	determine the appropriate method to solve problems related to partial differential equations
11.	23PMAO21	**Elective Courses Generic/ Discipline Specific - III:** Mathematical Statistics	**CO1[K1]:**	state the basic concepts and techniques in sampling theory and theory of statistical inference
			CO2[K2]:	explain the method of finding distribution function of random variablesand the testing process of hypothesis
			CO3[K3]:	apply the common test statistics to test statistical hypothesis and themaximum likelihood methods to find estimator of parameters
			CO4[K4]:	examine a particular hypothesis by the statistical inference of the given data
			CO5[K5]:	assess the strength of the conclusion of the statistical inference
12.	23PMAO22	**Elective Courses Generic/ Discipline Specific - III:** Financial Mathematics	**CO1[K1]:**	describe the application of mathematics and mathematical modeling to solve financial problems
			CO2[K2]:	explain the basic mathematical concepts
			CO3[K3]:	solve financial problems using mathematical models
			CO4[K4]:	analyze the mathematical models of financial problems
			CO5[K5]:	evaluate the solution of the mathematical

				models of financial problems
13.	23PMAO23	**Elective Courses Generic/ Discipline Specific - IV:** Number Theory and Cryptography	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	describe the fundamental theories in arithmetic and cryptography explain the basic concepts in number theory and the various ciphers incryptography apply the abstract concepts to produce proofs of results that arise in the context of number theory analyze the theory of quadratic residues and primitive roots, types ofcongruences determine the existence and non-existence of primitive roots mod p, quadratic residues mod m, solutions of congruences, averages ofarithmetic functions
14.	23PMAO24	**Elective Courses Generic/ Discipline Specific - IV:** Neural Networks	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	state the basic terminologies in neural network explain the features/principles/laws of neural network, neural network models apply the basic principles/ laws of neural network to build a neural network model classify the types of neural networks and characterize their characteristic evaluate the pattern recognition problem
15.	23PMAN21	**NON MAJOR ELECTIVE COURSE –I: STATISTICS FOR LIFE SCIENCES**	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	describe the basic terminologies in statistics explain the tools and techniques of statistics find various measures of descriptive statistics analyze the quantitative data and calculate different statistical measures choose the appropriate statistical measures to interpret the data

SEMESTER- III			
16.	23PMAC31	**Core Course–VII:** Complex Analysis	**CO1[K1]:** describe the methods and techniques of complex integration **CO2[K2]:** explain the basic concepts, theories, properties of functions of acomplex variable **CO3[K3]:** apply the abstract concepts to produce proofs of results that arise in the context of analytic functions **CO4[K4]:** interpret the several forms of Cauchy's theorem, the properties of harmonic and entire function **CO5[K5]:** evaluate the definite integrals by the method of residues, the series expansion, partial fractions, infinite products, canonical products of analytic functions
17.	23PMAC32	**Core Course –VIII:** Probability Theory	**CO1[K1]:** state the general probability rules and axioms, basic terminologies ofprobability theory **CO2[K2]:** explain the method of finding various parameters of probabilitydistributions, characteristic functions of random variables and the condition for the convergence sequence of distribution functions **CO3[K3]:** find the conditional probability of random events, various parameters of probability distributions, characteristic functions of random variables **CO4[K4]:** investigate the characteristics of probability distributions and its parameters, limits of sequence of distribution functions

			CO5[K5]:	determine various parameters of distributions of random variables, distribution function by the characteristic function
18.	23PMAC33	**Core Course–IX:** Topology	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	define and illustrate the basic concepts of topological spaces express connectedness, compactness of a topological spaces apply the abstract concepts to produce proof of results that arise in thecontext of general topology explore the characterizations of countability, separation axioms and continuity of functions evaluate the results that characterizes continuity of functions, connectedness, compactness, countability and separation axioms
19.	23PMAC34	**Core Course–X :** Mechanics	**CO1[K1]:** **CO2[K2]:** **CO3[K3]:** **CO4[K4]:** **CO5[K5]:**	state the laws and facts of mechanics explain the core principles in mechanics apply the core concepts and principles to solve complex problems in classicalmechanics interpret Lagrange's equation, Hamilton's equations, Hamilton – Jacobi equations and Canonicaltransformations of co-ordinates determine energy and momentum of mechanical systems, integrals of motion and separability of Hamilton
20.	23PMAO31	**Elective Courses Generic/ Discipline Specific - V:** Algebraic Number Theory	**CO1[K1]:** **CO2[K2]:**	describe the basic terminologies of algebraic number theory explain the tools and techniques of abstract algebra that are useful in solving number

			theory questions **CO3[K3]:** apply the abstract concepts to produce proof of results that arise in the context of algebraic number theory **CO4[K4]:** analyze the method of factorization/prime factorization of polynomials, factorization of an algebraic integer into irreducibles, prime factorization of ideals **CO5[K5]:** determine the uniqueness of factorization/prime factorization of polynomials,factorization of an algebraic integer into irreducibles, prime factorization of ideals
21.	23PMAO32	**Elective Courses Generic/ Discipline Specific - V:** Stochastic Processes	**CO1[K1]:** describe the basic terminologies in stochastic processes **CO2[K2]:** explain the general theory and properties of probability distributions and random processes **CO3[K3]:** compute the probability distribution of various random processes **CO4[K4]:** classify random processes according to state space and parameter space **CO5[K5]:** evaluate the statistical properties of random processes
22.	23PMAN31	**Non-Major Elective Course II:** Statistics for Social Sciences	**CO1[K1]:** describe the basic terminologies of index numbers and time series **CO2[K2]:** explain the methods of finding index numbers and trend values, variationsof the series **CO3[K3]:** calculate the value of index numbers and trend values, variations of timeseries

			CO4[K4]:	classify the types of index numbers and trend values
			CO5[K5]:	choose the appropriate method of finding index numbers and trend values to draw valid inference
SEMESTER- IV				
23.	23PMAC41	**Core Course –XI:** Functional Analysis	**CO1[K1]:**	describe the basic concepts, principles and methods of functionalanalysis
			CO2[K2]:	explain the various operators and fundamental theorems on Banach spaces,Hilbert spaces, Banach algebras
			CO3[K3]:	apply the analytical technique and theoretical knowledge to produce the proofs of results that arise in the context of functional analysis
			CO4[K4]:	examine the characterizations of Banach spaces, Hilbert spaces and Banach algebra
			CO5[K5]:	evaluate the structure of Banach spaces, Hilbert spaces, Banach algebras
24.	23PMAC42	**Core Course –XII:** Differential Geometry	**CO1[K1]:**	describe the basic concepts of space curves and surfaces
			CO2[K2]:	explain the theory of space curves and surfaces
			CO3[K3]:	apply the abstract concepts to produce the proofs of results that arise in thecontext of surface theory.
			CO4[K4]:	investigate the properties of various surfaces in the Euclidean space
			CO5[K5]:	evaluate the problems on space curves and surfaces
25.	23PMAJ41	**Core Course –XIII:** Project with VivaVoce	**CO1[K1]:**	identify the unexplored areas of research

			CO2[K2]: outline the objectives in formulating a research paper **CO3[K3]:** apply the latest rules of documentation to cite Print, Non-print and Web Publications in a research paper **CO4[K4]:** analyze the stages in writing a thesis – collecting and evaluating Sources and drafting documentation **CO5[K6]:** prepare a rightly documented research project with adequate discussion, interpretation and evaluation
26.	23PMAO41	**Elective Courses Generic/ Discipline Specific - VI:** Algebraic Topology	**CO1[K1]:** describe the basic terminologies in algebraic topology **CO2[K2]:** explain the fundamental concepts of algebraic topology **CO3[K3]:** apply the abstract concepts to produce the proofs of results that arise in thecontext of algebraic topology **CO4[K4]:** analyze the characterization of simplicial homology groups, thefundamental groups and covering spaces **CO5[K5]:** evaluate the structure of simplicial homology groups, the fundamental groups and covering spaces
27.	23PMAO42	**Elective Courses Generic/ Discipline Specific - VI:** Resource Management Techniques	**CO1[K1]:** describe the problem solving process in network models, inventory models, non-linear programming problems, constrained and unconstrained optimization problems **CO2[K2]:** explain the methods and algorithms of finding

			the optimum solution of network models, inventory models, non-linear programming problems, constrained and unconstrained optimization problems **CO3[K3]:** solve network models, inventory models, non-linear programming problems,constrained and unconstrained optimization problems **CO4[K4]:** investigate the solutions of network models, inventory models, non-linear programming problems, constrained and unconstrained optimization problems **CO5[K5]:** determine the appropriate method of solving network models, inventory models, non-linear programming problems, constrained and unconstrained optimization problems
28.	23PMAS41	**SkillEnhancementCourse**:**Professional Competency Course:**Training for Competitive Examinations	**CO1[K1]:** identify the formulas, identities related to binomial theorem, mathematicalinduction, permutation, combinations and describe the basic terminologies in reasoning, teaching aptitude and research methodology **CO2[K2]:** explain the concepts related to teaching aptitude, research methods, reasoning, binomial theorem, mathematical induction, permutation and combinations **CO3[K3]:** apply the concepts of reasoning, permutation and combination, mathematical induction, binomial theorems, teaching aptitude and researchmethodology to answer questions

			CO4[K4]: explore the choices of possible answers to the questions in competitiveexaminations **CO5[K5]:** choose the best answer to the questions in competitive examinations