

DEPARTMENT OF MATHEMATICS

Programme: B.Sc., MATHEMATICS

PO No.	Programme Outcomes Upon completion of the B.Sc., Degree Programme, the graduate will be able to
PO-1	emerge with competency in the subject of Mathematics and apply knowledge to cater to the needs of Society/Employer/Institution/Own Business Enterprise
PO-2	imbibe analytical/critical/logical/innovative thinking skills in the field of Mathematics and Statistics
PO-3	acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building
PO-4	communicate mathematical and statistical concepts, models, reasoning, explanation, interpretation and solutions clearly and effectively in multiple ways: orally, visually through FOSS, written reports and physical math models, as appropriate
PO-5	employ efficient and accurate mathematical programming and computing tools to solve real-life problems

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO-1	transform and empower women graduates to meet global challenges through holistic education in terms of recent teaching-learning methodologies
PSO-2	groom the graduates towards excellence through building communication skills, handling leadership challenges and negotiating career path ways
PSO-3	heighten the conscious of the graduates on socio-economic concern and to inculcate moral and ethical values to chisel them as better human being
PSO-4	maintain a core mathematical and technical knowledge that is adaptable to changing technologies, which will provide a solid foundation for future learning
PSO-5	expose students to the frontiers of higher education, creative research and the complexities of an interdependent world where mathematics is the common language

Course Title	ANALYTICAL GEOMETRY	
CODE	18MSUC305	
CO No.	Course Outcomes	Knowledge Level
CO-1	Develop the polar form of straight lines, circle and conic sections and also to understand their properties	K2
CO-2	Gain more profound knowledge on straight lines	K2
CO-3	Analyze the characteristics of sphere	K4
CO-4	Demonstrate the fundamental concepts of cone and cylinder	K1
CO-5	Integrate the concepts of cone and straight line	K3

Course Title	FOUNDATION COURSE IN MATHEMATICS	
CODE	18MSUC306	
CO No.	Course Outcomes	Knowledge Level
CO-1	Acquire the knowledge of Quantifier Statements, Compound statements and some proofs in mathematics	K2
CO-2	Apply the concept of basic terminologies, family of sets, power sets and Cartesian product of sets	K3
CO-3	Demonstrate the basic definitions of functions, composition of functions and inverse image of subsets under functions	K4
CO-4	Analyze the relations on sets and types of relations	K4
CO-5	Evaluate the concepts of induction principles, well-ordering principle and equivalence of the three principles	K5

Course Title	LINEAR ALGEBRA	
CODE	18MSUC407	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the basic concept of vector spaces	K1
CO-2	Identify the linear transformation and integrate it with matrices	K2
CO-3	Take a look at isomorphism, invertibility and dual spaces	K2
CO-4	Apply the ideology of matrices into systems of linear equations	K3
CO-5	Get aware of the concepts of inner product spaces	K1

Course Title	REAL ANALYSIS - I	
CODE	18MSUC408	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the concept of partial and total orders, bounds and maximal elements, axiom of choice and its equivalents	K2
CO-2	Determine the real number system concept, LUB, Absolute value and Triangle inequality	K3
CO-3	Analyze the sequences and their convergence, Cauchy and monotone sequences and sandwich lemma	K4
CO-4	Evaluate some important limits and diverging sequence	K4
CO-5	Apply the concept of continuity	K5

Course Title	MATHEMATICS FOR PHYSICS– I	
CODE	18MSUA3P3	
CO No.	Course Outcomes	Knowledge Level
CO-1	Set forth the idea of infinite series and to apply them in real life problems	K2, K3 & K4
CO-2	Study the mathematical models of physical problems and solve them	K1
CO-3	Learn the concepts of partial differential equations and apply them	K1, K3& K4
CO-4	Introduce the concepts of Laplace transforms	K1 & K3
CO-5	Apply Laplace transforms to solve differential equations	K2 & K4

Course Title	LATEX AND SAGEMATH	
CODE	18MSUAPP1	
CO No.	Course Outcomes	Knowledge Level
CO-1	Use LaTeX to create a document	K1
CO-2	Use SageMath as a calculator	K1
CO-3	Solve mathematical problems and to plot using SageMath	K2
CO-4	Encode LaTeX command in SageMath and to insert SageMath graph in a LaTeXdocument	K3
CO-5	Use LaTeX to create a document	K1

Course Title	MATHEMATICS FOR CHEMISTRY – I	
CODE	18MSUA3C3	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the concepts of matrices	K1, K2
CO-2	solve the system of linear equation using matrix concepts	K2
CO-3	Understand the meaning of differentiation using limits	K3
CO-4	Evaluate integration of trigonometric functions	K2
CO-5	Apply calculus concepts to solve real-world problems such as finding areas and volumes	K3

Course Title	SAGE MATH & OCTAVE	
CODE	18MSUAPC1	
CO No.	Course Outcomes	Knowledge Level
CO-1	Use SageMath as a calculator	K3
CO-2	Solve the problems on matrices	K3
CO-3	Make use of theoretical concepts to solve problems and visualize the output	K3
CO-4	To visualize the geometry through these software	K3

Course Title	MATHEMATICS FOR COMMERCE	
CODE	18MAUA303	
CO No.	Course Outcomes	Knowledge Level
CO-1	Learn about HCF, LCM, Progressions and about Ratios and Proportion.	K1, K2
CO-2	Study the concept of matrices and applying it to solve simultaneous linear equations	K2
CO-3	Acquire knowledge about mathematics of finance	K3
CO-4	Know the concept of differentiation and its application to business problems.	K2, K3
CO-5	Learn the concept of integration and its application in business economics.	K2

Course Title	MATHEMATICS FOR PHYSICS – II	
CODE	18MSUA4P4	
CO No.	Course Outcomes	Knowledge Level
CO-1	Introduce the concepts of vectors and to apply in physical problems	K1 & K3
CO-2	Evaluate multiple integrals in both Cartesian and polar coordinates	K1
CO-3	Apply multiple integrals to find area under a given curve and to evaluate improper integrals	K1 ,K3 & K4
CO-4	Find the Fourier series to various functions	K2
CO-5	Learn the Fourier integrals for odd and even functions	K1

Course Title	OCTAVE	
CODE	18MSUAPP2	
CO No.	Course Outcomes	Knowledge Level
CO-1	Use Octave as a calculator	K1
CO-2	Plot graphs to improve presentations	K2
CO-3	Visualize the mathematical concepts through 3D plots	K2
CO-4	Learn looping concept to various mathematical problems	K3

Course Title	MATHEMATIS FOR CHEMISTRY – II	
CODE	18MSUA4C4	
CO No.	Course Outcomes	Knowledge Level
CO-1	Find the sum of finite and infinite Binomial, Exponential and Logarithmic series	K1
CO-2	Solve equations using various techniques	K2
CO-3	To learn about various measures of central tendencies and their appropriate usage	K3
CO-4	To study the measures of dispersion	K3
CO-5	To understand the relationship between the variables under consideration	K2

Course Title	R SOFTWARE	
CODE	18MSUAPC2	
CO No.	Course Outcomes	Knowledge Level
CO-1	Be equipped with the professional competency through learning Free Open Source Software – R	K3
CO-2	Create the database, visualizing and analyzing the data using R	K2
CO-3	Make inferences through the results obtained	K4

Course Title	STATISTICS FOR COMMERCE	
CODE	18MAUA404	
CO No.	Course Outcomes	Knowledge Level
CO-1	Learn about various measures of central tendencies and their appropriate usage.	K2, K3
CO-2	Study the measures of dispersion.	K3
CO-3	Understand the relationship between the variables under consideration.	K3
CO-4	Find the missing values in the given data using interpolation.	K3
CO-5	Know the concepts of index numbers and time series analysis	K2

Course Title	STATISTICAL SOFTWARE R	
CODE	18MAUAP01	
CO No.	Course Outcomes	Knowledge Level
CO-1	Be equipped with the professional competency through learning Free Open Source Software – R	K3
CO-2	Create the database, visualizing and analyzing the data using R	K2
CO-3	Make inferences through the results obtained	K4

Course Title	REAL ANALYSIS - II	
CODE	18MSUC509	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the concept of limits and uniform continuity	K2
CO-2	Analyze the precise proofs of results that arise in the context of real analysis	K3
CO-3	Analyze the derivatives of higher orders	K4
CO-4	Evaluate convergence of Infinite Series	K4
CO-5	Analyze the concept of open ,closed sets	K5

Course Title	GROUP THEORY	
CODE	18MSUC510/ 18MCUC512	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the concept of relations & functions	K1 & K2
CO-2	Recognize the mathematical objects, known as groups	K2
CO-3	Classify the groups into normal, cyclic and permutation groups	K3
CO-4	Apply the concept of functions in groups as isomorphisms	K3
CO-5	Generalize the idea of isomorphism as homomorphisms	K2

Course Title	MECHANICS	
CODE	18MSUC511/ 18MCUC306	
CO No.	Course Outcomes	Knowledge Level
CO-1	Define Resolution of a force	K1
CO-2	Evaluate like and unlike forces	K2
CO-3	Illustrate couples and coplanar forces	K3
CO-4	How to find relative velocity and relative angular velocity	K3
CO-5	Analyze the concept of range on an inclined plane	K4

Course Title	PYTHON PROGRAMMING (Theory)	
CODE	18MSUC512/18MCUC513	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the Constants, Variables , Identifiers and Data Types	K1,K2
CO-2	Study about the Operators and Expressions, Type Conversion.	K3
CO-3	Develop algorithms using Decision Control Statements, Basic Loop Structures, Iterative Statements	K4
CO-4	Analyze the Functions and Modules, Concatenating, Appending and Multiplying Strings	K2
CO-5	Determine the Sequence, Lists, Tuple and acquire the knowledge about the Dictionaries	K3

Course Title	OPERATIONS RESEARCH – I	
CODE	18MSUE501/18MCUE501	
CO No.	Course Outcomes	Knowledge Level
CO-1	Learn the concept of Linear Programming Problem (LPP)	K1
CO-2	Solve LPP through various techniques	K2
CO-3	Demonstrate the inventory model with optimum EOQ	K3
CO-4	Plan and schedule the sequence of activities, find the critical path and duration/probability of completing the project	K2
CO-5	Determine the optimal strategies using Game theory	K2

Course Title	COMBINATORICS	
CODE	18MSUS503/19MCUS604	
CO No.	Course Outcomes	Knowledge Level
CO-1	Get introduced the fundamental concepts of graphs and to know the characterization of graphs	K1
CO-2	To learn the concepts such as cycles, circuits and coloring in graphs and their applications.	K2
CO-3	Understand the counting of configurations or arrangements and selections associated with finite systems.	K3
CO-4	Obtain solutions for complicated counting problems using generating functions.	K3
CO-5	Identify solutions to the counting problems by the technique of recurrence relations.	K3

Course Title	REAL ANALYSIS – III	
CODE	18MSUC613	
CO No.	Course Outcomes	Knowledge Level
CO-1	Acquire the knowledge of Darbouxintegrability and fundamental theorems of calculus	K2
CO-2	Evaluate Riemann integration of infinite series	K3
CO-3	Knowing the concept of convergence in sequences and series	K1
CO-4	Determine the power series ,Taylor Series, etc.,	K4
CO-5	Analyze the concepts of multivariable calculus	K3

Course Title	COMPLEX ANALYSIS	
CODE	18MSUC614 / 18MCUC614	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand Elementary Transformations, Invariance of Cross - Ratio and Stereographic Projection.	K2
CO-2	Analyze Cauchy - Riemann Equation in Polar Coordinates and Harmonic Functions	K2
CO-3	Derive Cauchy's fundamental theorem, Cauchy's Integral formula, formula for derivatives and Related Integral Theorems.	K3
CO-4	Determine Taylor's series, Laurent's series and to find singularities	K4
CO-5	Evaluate Real definite integrals using calculus of residues, and function meromorphic in the extended plane	K4

Course Title	RING THEORY & MATRIX THEORY	
CODE	18MSUC615/18MCUC615	
CO No.	Course Outcomes	Knowledge Level
CO-1	To understand the idea of rings	K1
CO-2	To extend the concept of rings to integral domains	K2
CO-3	To apply the notion of homomorphisms in rings and understand the division algorithm	K1& K3
CO-4	To familiarize about Eigen values and Eigen vectors	K2
CO-5	To apply the Eigen values and Eigen vectors in diagonalizing the matrices	K3

Course Title	DISCRETE MATHEMATICS	
CODE	18MSUE602	
CO No.	Course Outcomes	Knowledge Level
CO-1	Understand the statements & notations, Connectives, tautological implications and other connectives	K1,K2
CO-2	Study about the Normal forms, the theory of inference for the statement and predicate calculus	K3
CO-3	Demonstrate the fundamental concepts of Trees, spanning trees , Rooted and binary trees	K4
CO-4	Analyse about Grammars and languages and discuss about computability theory	K2
CO-5	Evaluate the concepts of Lattices and Boolean algebra with their properties and the representation and minimization of Boolean functions	K3

Course Title	OPERATIONS RESEARCH – II	
CODE	18MSUE603/18MCUE603	
CO No.	Course Outcomes	Knowledge Level
CO-1	Solve the IPP using Gomory's All IPP and mixed IPP method	K2
CO-2	Obtain the solution of multistage decision process using DPP	K3
CO-3	Solve the transportation problems through various techniques	K2
CO-4	Apply Lagrangian Multipliers Solve non-linear programming problems	K3
CO-5	Classify the queues and solve them to provide necessary service and suggestions	K3

Course Title	NUMERICAL METHODS	
CODE	18MSUS604	
CO No.	Course Outcomes	Knowledge Level
CO-1	Find the roots of transcendental equations	K1, K2
CO-2	Derive the numerical solutions of simultaneous linear equations using different methods	K3
CO-3	Learn how to interpolate and extrapolate for an unknown value from given set of values	K2
CO-4	Compute the numerical solutions of differentiation of functions	K2
CO-5	Evaluate the definite integrals using numerical methods	K3