Table 29

Govt. P G. College , Khargone
Department of Mathematics

Sr. No.	Name Of Program	Course	Course Title	Course Objective	Expected Outcome
1	MASTER OF SCIENCE	M.Sc-I Sem	Advanced Abstract Algebra-I	The main objective of this programe is to cultivate a mathematical aptitude and nurture the intereste of the students towards problem solving aptitude. Further, it aims at motivating the young minds for research in	After completing the course, students will able to- 1. Identify the various algebraic structures with their corresponding binary operations. 2. Generalize the groups on the basis of their orders, elements, order of elements and group relations. 3. Compare two groups of same orders on the basis of isomorphism Criteria. 4. Compute the possible subgroups of given group of specific orders and will recognize them.
			Real Analysis		After completing the course, students will able to- 1. Know sequence and series of real numbers and their convergence and divergence. 2. Understand basic theory of Riemann integrals, Improper integrals and its applications.
			Topology-I		After completing the course, students will able to- 1. Understand various basic topologies. 2. Understand the core ideas of countability and uncountability. 3. Understand the heridatory topological properties.
			Complex Analysis-I		After completing the course, students will able to- 1. Analyze sequence and series of analytic functions and types of convergence. 2. Represent complex numbers pictorially and geometrically. 3. Apply concept and consequences of analyticity and C-R- equations.
			Advanced Discrete Mathematics-I		After completing the course, students will able to- 1. Acquire knowledge of fundamental notions from lattice theory and from properties of lattice theory 2. Develop ability to solve individually and creatively advanced problems of lattice theory and also problems connected with its applications to mathematics.

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Sr. No.	Name Of Program	Course	Course Title	Course Objective	Expected Outcome
		M.Sc-II Sem	Advanced Abstract Algebra-II		After completing the course, students will able to- 1. Assess properties implied by the definitions of group 2. Use various canonical types of groups including cylic groups and groups of permutations 3. Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups 4. Use various theorems on "Sylow theorems" to identifying the whole structure of group of given Order.
			Lebesgue Measure & Integration		After completing the course, students will able to- 1. Understand basic theorem on lebesgue measure 2. Understand basic theory of measurable set, measurable functions, measurability 3. Determine the Riemann integrability.
			Topology-II		After completing the course, students will able to- 1. Understand the theory of compactness, connectedness and completeness 2. Understand the theorems on normal spaces, regular spaces and relation between them.
			Complex Analysis-II		After completing the course, students will able to- 1. Compute complex contour integrals and applying the Cauchy"s integral in various versions. 2. Understand geometric interpretations of complex numbers.
			Advanced Discrete Mathematics-II		After completing the course, students will able to- 1. Understand the language of graphs and model. 2. Understand the use of graphs as model. 3. Solve real world problems using graphs and trees.
		M.Sc-III Sem	Advanced Functional Analysis-I		After this course, 1. A student learns the basics of functional analysis. 2. They learn to treat the vector spaces which have the additional property of being topological spaces. 3. Blending of these two structures brings them an exposure to higher mathematics. Important theorems like the Hahn-Banach theorem are taught here. These theorems stand a student in good stead throughout his mathematical life.

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Sr. No.	Name Of Program	Course	Course Title	Course Objective	Expected Outcome
			Advanced Special Functions-I		After successful completion of this course , students will be able to- 1. Solve the problems by different using relations of Gamma Function and Beta function. Evaluate the improper integrals. 2. Write solution of Linear Differential Equations with variable coefficients in Series form. Apply the theorems to find relations among the parameter in the hypergeometric function. 3. Understand Bessel Functions, Legendre polynomials and their properties.
			Theory Of Linear Operators-I		After completing this course, students will able to- 1. Use the concept of inner product spaces to find norm of vectors, distance between vectors, check the orthogonality of vectors, to find the orthogonal and orthonormal basis.
			Operations Research-I		After completing the course, students will able to- 1. Formulate and model a LPP from a word problem and solve them graphically in 2-D. 2. Modify a primal problem and use the LPP to identify the new solution. 3. Understand basic notions like feasibility, infeasibility, basic solutions, unbounded solutions etc.
			Analytic Number Theory-I		After completing the course, students will able to- 1. Handle multiplicative functions, to deal with dirichlet series as function of a complex variable, and to prove the prime number theorem and simple varients. 2. Understand number theory using analytics tools. 3. To be able to use the theory in specific examples.
		M.Sc-IVSem	Advanced Functional Analysis-II		After successful completion of this course , students will be able to- 1. Understand Inner Product Space & their properties.
			Advanced Special Functions-II		After successful completion of this course , students will be able to- 1. Understand different polynomials & Solve the problems based on them.

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Sr. No.	Name Of Program	Course	Course Title	Course Objective	Expected Outcome
			Theory Of Linear Operators-II		1. Students will be able to solve and understand Fredholm type theorems and its alternates. 2. Students will be able to understand behavior of compact linear operators, projections and Hilbert space. They will learn spectral family and spectral representation of bounded self adjoint linear operators.
			Operations Research-II		After completing the course, students will able to- 1. solve pratical problems of transportataion, assignment of jobs for optimum results. 2. Understand probability based problems which are aaplicable in life.
			Analytic Number Theory-II		After completing the course, students will able to- 1. Apply the techniques of complex analysis to study a range of specific problems in number theory. 2. Gain an understanding and appreciation of analytic number theory and some of its important application.

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Sr. No.	Name of Program	Course	Course Title	Course Objective	Expected Outcome
1			Algebra and Geometry	(i) A student should be able facts about mathematics and sh display knowledge of cor as notations, terminolog recognize basic geometrica graphical displays, state imp resulting from their studies. (ii) A student should get a understanding of mathematical concerned structures, and shoul follow the patterns involved reasoning. (iii) A student should ge exposure to global and local explore them many aspects Sciences. (iv) A student be able to apply t knowledge that is, tran presented verbally into	(v) After completing this cour 1. Solve various problems on properties of integers congruence and their applications in basic algebra. 2. apply factor theorem, remainder theorem to using given relations between roots he will find 3. solve the system of homogeneous and r variables by using concept of rank of matrix, findir and eigen vectors. 4. Solve the problems of lines in three dimension geometry is related to algebra by using their algebraic After completing the course, students will able to- 1. Identify algebraic and order properties of real nu Identify and apply the function properties of real
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Sr. No.	Programme	Course	Course Title	Course objective	Expected outcome
1.	Bachelor of Science	B.Sc. I yr	Algebra & Trigonometry	(i) A student should be able To recall basic facts about mathematics and should be able to display knowledge of Conventions such as notations ,Terminology and recognize basic trigometrical figures and graphical displays, state important facts resulting from their studies. (ii) A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.	1. Solve various problems on properties of integers and use the basic concepts of divisibility, congruence and their applications in basic algebra. 2. apply factor theorem, remainder theorem to solve problems on polynomials and by using given relations between roots he will find the roots of polynomials 3.solve the system of homogeneous and non homogeneous linear of m equations in n variables by using concept of rank of matrix, finding Eigen values and Eigen vectors.
2.			Calculus & Differential Equation	A student should get adequate exposure to global and local concerns that explore them many aspects ofMathematical Sciences.	1. Verify the values of limit of a function at a point using the definition of a limit. 2.Students will be familiar with the techniques of integration and differentiation of function with real variables 3. Identify and apply the intermediate value theorem, Mean value theorem and L"Hospital"s rule. 4. Identify types of differential equations and solve differential equations such as Exact, homogeneous, non-homogeneous, and linear

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					and Bernoulli differential equations etc.
3.			Vector Analysis & Geometry	Use the various techniques of solving Integral problems of vector valued functions.	After completing this course student will be able to 1. Students developknowledge in the limit, continuity, differentiation of vector functions. 2. Assesstheoretical and practical problems that involves geometry. 3.Generalize basic notions of reflection, rotation, projection with real life examples
4.		B.Sc. II year	Abstract Algebra		1. Identify the various algebraic structures with their corresponding binary operations. 2.generalize the groups on the basis of their orders, elements, order of elements and group relations 3. Compare two groups of same orders on the basis of isomorphism Criteria. 4.Compute the possible subgroups of given group of specific orders and will recognize them.
5.			Advanced Calculus		1.Compute double integrals, applications to area and volume, Green"s thm in the plane and the change of variables in double integrals 2.Understand basic notions such as derivative of the scalar field w.r.to vector field, gradient of scalar field,

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					paths and line integrals 3.Recognize fundamental vector product, area of various parametric surfaces
6.			Differential Equation		1.Solve linear differential equations with constant coefficients, non-homogeneous differential equations, system of first order equations, solution of differential equations by Power series method
7.		B.Sc. III year	Linear Algebra & Numerical Analysis		1. Use the concept of basis and dimension of vector spaces linear dependence and linear independence, to solve problems. 2. Use the concept of inner product spaces to find norm of vectors, distance between vectors, and check the orthogonality of vectors, to find the orthogonal and orthonormal basis. 3. Apply the properties of linear transformations to linearity of transformations, kernel and rank of linear transformations, inverse transformations to solve the problems of matrix transformations, change of basis.
8			Real & Complex Analysis		1. After completing the course, students will able to -know sequence and series of real numbers and their convergence and divergence. 2. Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given

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					continuous function is complex differentiable. 3.Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem, 4. Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues, prove the Cauchy Residue Theorem and use it to evaluate integrals.
9			Statistical Methods	Student will know about statistical inference probability distributions,computational statistics and design of experiment and data mining.	Using this subject student will come to know: Measures of central tendency, S.D.,Binomial ,Poisson and normaldistribution.