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KARNATAKA STATE AKKAMAHADEVI WOMEN'S UNIVERSITY, VIJAYAPURA

Department of Mathematics

Programme Outcomes

The Program Objectives are the knowledge skills and attributes which the students have at the time of post-graduation. At the end of the program, the student will be able to**:**

PO 1: To provide comprehensive curriculum to groom the students into qualitative scientific man power.

PO 2: Enable students to enhance mathematical skills and understand the fundamental concepts of pure and applied mathematics.

PO 3: To provide qualitative education through effective teaching learning processes by introducing projects, participative learning and latest software tools.

PO 4: To inculcate innovative skills, team work, ethical practices among students so as to meet societal expectations.

PO 5: To encourage collaborative learning and application of mathematics to real life situations.

PO 6: To inculcate the curiosity for mathematics in students and to prepare them for future**.**

Programme Specific Outcomes

PSO 1: Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.

PSO 2: Inculcate mathematical reasoning.

PSO 3: Prepare and motivate students for research studies in mathematics and related fields.

PSO 4: Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineeringdomains.

PSO 5: Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.

PSO 6: Strong foundation on algebraic topology and representation theory which have strong links and application in theoretical physics, in particular string theory.

PSO 7: Good understanding of number theory which can be used in modern online cryptographic technologies.

PSO 8: Nurture problem solving skills, thinking, creativity through assignments, project work.

PSO 9: Assist students in preparing (personal guidance, books) for competitive exams e.g. NET, GATE, etc.

Course Outcome:

22MHT-1.1	Algebra-I

CO 1: Earn factor group computation.
CO 2: The notion of group action on a set
CO 3: Understand the notion of free groups
CO 4: Understand the concepts rings of polynomials and ideals

22MHT-1.2	Discrete Mathematical Structures

CO 1: Acquire knowledge of Boolean algebras and Boolean function and understand how these concepts arise in certain real life problems.
CO 2: Learn the concepts of *n*-ary Relations and closures of relations.
CO 3: Understand the fundamentals of Graphs
CO 4: Learn the structure of graphs and the basic concepts used to analyze different problems in different branches such as chemistry, computer science etc.

22MHT-1.3	Ordinary Differential Equations

CO 1: Learn the existence of uniqueness of solutions for a system of first order ODEs.
CO 2: Learn many solution techniques such as separation of variables, variation of parameter power series method, Frobeniious method etc.
CO 3: Learn method of solving system of first order differential calculus equations.
CO 4: Get an idea of how to analyze the behavior of solutions such as stability, asymptotic stability etc.

22MST-1.4a	Fluid Dynamics-I

CO 1: Fundamentalaspectsoffluidflowbehaviors.
CO 2: Dynamicsofviscousfluidflowsandgoverningequationsof motion
CO 3: Describestress-strainrelationshipofNewtonianfluids.
CO 4: DeriveBernoulli's equation, energy equation.

22MST-1.4b	Linear Programming

CO 1: Formulate a given simplified description of a suitable real-world problem as a linear programming model in general, standard and canonical forms

CO 2: Formulate the dual problem.

CO 3: classify a two-dimensional linear programming model by the type of its solution.

CO 4: Use the simplex method to solve small linear programming models by hand, given a basic feasible point.

22MST-1.4c	Combinatorics and Probability

CO 1: Usetechniquesofenumerationinreallifeproblems
CO 2: Modeltherealifesituations usingprobabilitytheory.
CO 3: Will learn thetheoryofenumerationandprobability
CO 4: Moments and Joint Distribution

22MCP-1.5	Practical's using Scilab and Maxima based on MHT 1.2and Typesetting in Latex

CO 1: Students will Learn Installation of the software Scilab.
CO 2: Students will Learn Basic syntax, Mathematical Operators, Predefined constants, Built in functions
CO 3: Students will Learn Complex numbers, Polynomials, Vectors, Matrix. Handling these data structures using built infunctions
CO 4: Students will learn programming.

CO 1: Students will learn Installation of the software LATEX
CO 2: students will learn Understanding LATEX compilation
CO 3: students will learn Basic Syntex, Writing equations, Matrix, Tables
CO 4: students will learn Page Layout: Titles, Abstract, Chapters, Sections, Equation References, citation etc.

22MHT-1.6	Bharatiya Ganita-I

CO 1: Learn about the contributionofAncient Indian Mathematicians .
CO 2: Know more about fundamental operations.
CO 3:Understand the Bhaskaras's Rules.
CO 4: Know more about Brahmagupta's rule.

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22OE-1.7	Foundation of Mathematics

CO 1: Evaluate roots ofequations.
CO 2: analyze Races and Gameskills.
CO 3: Learn and apply quantitativeaptitudeanddatainterpretation

22MHT-2.1	Algebra-II

CO1: Understand the concepts of vector spaces, subspaces, bases, dimension and their properties.
CO2: Relate matrices and linear transformations, compute Eigen values and Eigen vectors of linear transformations.
CO3: Learn properties of inner product spaces and determine orthogonality in inner product spaces. Obtain various variants of diagonalisation of linear transformations

22MHT-2.2	Real Analysis

CO1: Develop a reasoned argument in handling the sequence and series of functions.
CO2: Develop the ability to reflect, quite significant in the field of real analysis.
CO3: Learn the theory of Riemann-Stieltjes integrals, to be aquainted with the ideas of the total variation and to be able to deal with functions of bounded variation.

22MHT-2.3	Partial Differential Equations

CO1: Establish a fundamental familiarity with partial differential equations and their applications.
CO2: Distinguish between linear and nonlinear partial differential equations.
CO3: Solve boundary value problems related to Laplace, heat and wave equations by various methods. Use Green's function method to solve partial differential equations.
CO4: Find complete integrals of Non-linear first order partial differential equations.

22MST-2.4a	Fluid Dynamics-II

CO1: Understanding the behavior of viscous fluid dynamics.Derive and solve equation of continuity, Energy equation, vorticity equation.
CO2: Determination of non-dimension parameters for a given system.To apply the knowledge of laminar flows to find pressure drop in pipes.
CO3: Understand the of Boundary layer theory and Fluid flow in Biological model.

22MST-2.4b	Graph Theory

CO1: Model real world problems and solve them using basic Graph Theory.
Understand graph, subgraphs, connected and disconnected graphs etc.
CO2: Differentiate between Hamiltonian and Eulerian graphs.
CO3: Solve problems involving vertex, edge connectivity, planarity and edge coloring. Apply tree and graph algorithms to solve problems.

22MST-2.4c	Tensor Analysis

CO1: Study the most fundamental knowledge for understanding tensors were taught in the traditional way

.**CO2**: Prior to our applying tensor analysis to our research area of modern continuum mechanics.

CO3: Tensor analysis provides a kind of bridge between elementary aspects of linear algebra, geometry and analysis.

22MCP-2.5	Practical's using Scilab/Maxima based on MHT 2.1 and MHT 2.3

CO1: Students will have the knowledge and skills to implement the programs listed below in the Scilab/Maxima programming language.

CO2: Students can be expected to apply these programming skills of computation in science and Engineering**.**

22MHT-2.6	Bharatiya Ganita-II

CO1: After completing this course student are expected to have a fair knowledge about the ancient Mathematics

CO2: Understand the concepts of indeterminate equation of first degree, simultaneous indeterminate equation of First Degree given by different ancient Indian Mathematicians

CO3: Student get knowledge about the solution of General Indeterminate Equation of the Second Degree-Single equation for different types of equations.

22OE-2.7	Business Mathematics

CO1: Define basic terms in the areas of business calculus and financial mathematics

CO2: Solve problems in the areas of Business calculus simple and compound interest

CO3: Connect acquired knowledge and skill with the practical problems in economic practice.

22MHT-3.1	Complex Analysis

CO1: Introduce and develop a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, Cauchy- Riemann relations and harmonic functions.
CO2: Know the fundamental concepts of complex analysis.
CO3: Establish the capacity for mathematical reasoning through analyzing, proving and explaining concepts from complex.

22MHT-3.2	Numerical Methods

CO1: The knowledge of Numerical Mathematics to solve problems efficiently arising in science, engineering and economics etc.
CO2: Utilize the tools of the Numerical Mathematics in order to formulate the real-world problems from the view point of numerical mathematics.
CO3: Design, analyze and implement of numerical methods for solving different types of problems, viz

22MHT-3.3	Programming in Python

CO 1: to acquire programming skills core python.
CO 2: to acquire object oriented skills in python.
CO 3: to develop ability to write data base application in python.

22MST-3.4(a)	Number Theory

CO1: learn more advanced properties of primes and pseudo primes.
CO2: apply Mobius Inversion formula to number theoretic functions.
CO3: explore basic idea of cryptography.

22MST-3.4(b)	Magnetohydrodynamics

CO1: Derive theGauss law-Faraday'slaw-Ampere'slaw, basic equations of MHD
CO2: determination -Non-dimensionalnumbers, Boundaryconditionsonvelocity,temperatureandmagnetic.
CO3:Solve Alfven waves: Lorentz force as a sum of two surface forces- cause for Alfven waves.

22MST-3.4(c)	Differential Geometry

CO1: basic concepts of differential geometry
CO2: Understand the basic concepts and results related to space curves, tangents, normals and surfaces
CO3: Understand principal directions and curvatures, asymptotic lines and then apply their important theorems and results to study various properties of curves and surfaces**.**

22MCP-3.5	Practical's using Scilab/Maxima/Matlab based on MHT 3.1

CO1: Construction of analytical function when the Imaginary part of $f(z)$ is given.

CO2: Evaluation of counter integral by Cauchy's integral formula and plot the solution.

CO3: Evaluation of Riemann Mapping theorem.

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22MHT 3.6	Python Lab based on MHT 3.2

CO 1: Students will learn basic numerical techniques in Python. They will also know how to apply several scientific packages normally used in applied work.
CO 2: Students will learn how to solve and analyze economics models and produce quantitative answers to a variety of practical problems.
CO 3: Students will also learn practical techniques in numerical methods in Python. The course is hands-on and they will learn by doing several scientific packages that are often used in practical applications in business economics.

22OE-3.7	Elementary Mathematical Modelling

CO1: Calculate derivatives of different functions.
CO2: Solve Real world problems of physics, chemistry, biology and others.
CO3: SolveNonlinear system of equations.

22MHT-4.1	Functional Analysis

CO 1: Understand the concept of Open sets, Closed sets, Bounded sets,
CO 2: Develop abilityFinite dimensional spectral theory, matrices, determinants.

22MHT-4.2	Topology

CO1: Analyze the conditions needed to prove that a space is normed linear space or a Banachspace.

CO2: Understand the concept of linear functionals and Hahn-Banach theorem. Define the concept of reflexive spaces and understand some standard theorem

CO3: Understand the concept of Hiblert space Analysing the structure of the spectrum of certain operators

22MHT-4.3 a	Operational Research

CO1: Understand the core principles of mathematical modeling. Apply precise and logical reasoning to problem solving.
CO2: Frame quantitative problems and model them mathematically.
Analyze the importance of differential equations in mathematical modeling.

CO3: Formulate the observable real problem mathematically.

22MHT-4.3 b	Mathematical Modelling

CO1: Understand theMathematical modelling of epidemics through systemsofordinarydifferential equation.
CO 2: : Learn about theMathematicalmodellingthroughdifferenceequationsinpopulationdynamicsandgenetics.

22MHT-4.3 c	Measure Theory

CO1: Describe the shortcomings of Riemann integral and benefits of Lebesgue integral.
CO2: Understand the fundamental concept of measure and Lebesgue measure.
CO3: Learn about the differentiation of monotonic function, indefinite integral, use of the fundamental theorem of calculus.

22MHT-4.3 d	Fuzzy Sets and Fuzzy System

CO1: Be able to distinguish between the crisp set and fuzzy set concepts through the learned differences between the crisp set characteristic function and the fuzzy set membership function.
CO2: Be able to draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions respectively.
CO3: Become aware of the use of fuzzy inference systems in the design of intelligent or humanistic system

22OE-4.5	Mathematical Techniques

CO1: Apply transformations and use symmetry to analyze mathematical situations**.**
CO2: Compute Symmetric and Skew tensors
CO3: Solve onjugate elements and classes