Department of Mathematics

PROGRAM EDUCATIONAL OBJECTIVE

Technical Proficiency:

Provide a degree course suitable for students of high ability, combining and relating mathematics, statistics and the social sciences

Professional Growth:

Prepare students for further study, or for professional and managerial careers particularly in areas requiring the application of quantitative skills

Management Skills:

Provide students with knowledge of mathematics, Management and the interaction between the two

PROGRAMME OUTCOME

POs describe what students are expected to know or be able to do by the time of graduation from the programme. The Program Outcomes of UG in Mathematics are:

At the end of the programme, the students will be able to:

- Think in a critical manner
- Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand
- Formulate and develop mathematical arguments in a logical manner
- Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses
- Understand, formulate and use quantitative models arising in social science, business and other contexts

UG Course Outcomes
Mathematics

Year-1
Course Title: **Differential Calculus**
Paper- I
Paper Code-BM101
Status: Compulsory Course
Course Instructors: 1. Dr Preet Pal Singh, Associate Professor
Dept. of Mathematics.

Mobile: 9458941910

Email: ppsingh003@gmail.com

After Successful completion of this course, students will be able to:

- Define limit, continuity and differentiability of a function and applications of mean value theorem
- Find the successive differention and n^{th} differential coefficient of function.
- Expand functions, identify indeterminate forms and solve it
- Define tangent and normal and their application both in Cartesian and polar form
- Trace the curve and find singular points
- Understand curvature and asymptotes and find them for a given curve

Course Title: **Integral calculus and Trigonometry**
Paper- II
Paper Code-BM102

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Co-ordinator, NAAC
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Doiwala, Dehradun.

Status: Compulsory Course
Course Instructors: 1. Dr Sujata, Assistant Professor
                    Dept. of Mathematics,

Mobile: 9997683002

Email: sujata.singh08@gmail.com

After Successful completion of this course, students will be able to:
- Understand the concept of integral as a limit of sum and properties of definite integrals.
- Know the infinite integrals and differentiation and integration under the integral sign.
- Know about the Beta function, Gamma function, their properties, their relation and evaluation of them
- Evaluate double integrals and repeated integrals.
- Distinguish among different numbers and Identify the relation and mapping between different sets.
- Find the roots of the Equation.
- Know the concept of matrix and define different type of matrices.
- Understand different Trigonometrical functions and Trigonometric series and their applications.

Course Title: **Algebra and Matrices**

Paper- III

Paper Code-BM103

Status: Compulsory Course

Course Instructors: 1. Dr Preet Pal Singh, Associate Professor
                    2. Dr Sujata, Assistant Professor
                    Dept. of Mathematics,

After Successful completion of this course, students will be able to:
- Distinguish among different numbers and Identify the relation and mapping between different sets.
- Find the roots of the Equation.
- Know the concept of matrix and define different type of matrices.
- Application of matrices to find the solutions of system of linear homogenious equations and system of linear non- homogenious equations.

Year-II

Course Title: **Differential Equations**

Paper- I

Paper Code-BM201

Course Instructors: 1. Dr Preet Pal Singh, Associate Professor
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After Successful completion of this course, students will be able to:

- Understand the concept of order and degree, complete primitive and existence and uniqueness of the solution.
- To solve the differential equations of first order and first degree and the differential equations of first order but not of first degree.
- To understand the concept of trajectory, orthogonal trajectory, and self orthogonal family of curves.
- Find the solution of linear differential equations with constant coefficients and homogeneous differential equations.
- Solve simultaneous, exact, total differential equations and linear differential equations of second order with variable coefficients.
- Solve a differential equation by series solution method and also learn about the simple application of differential equations.

Course Title: **Real Analysis**

Paper- II

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Paper Code-BM 202
Course Instructors: 1. Dr Sujata, Assistant Professor
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After Successful completion of this course, students will be able to:

- Understand the concept of continuity and differentiability of functions;
- Know about Riemann integral and mean value theorem of integral calculus;
- Identify the improper integral and test their convergence;
- Understand the concept of sequence and series, Cauchy's convergence criterion;
- Know about uniform convergence, point wise convergence, test of uniform convergence;
- Know about definition and equation of a cylinder, right circular cylinder and enveloping cylinder;
- Understand the concept of conicoids, central conicoids and conjugate plane.

Course Title: **Advanced Algebra**
Paper- III
Paper Code-BM203
Status: Compulsory Course
Course Instructors: 1. Dr Preet Pal Singh, Associate Professor
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After Successful completion of this course, students will be able to:

- Define Ring, Sub ring and their properties.
- Understand the concept of ideal and define different type of ideals.
- Define Integral domain,field and their properties.
- Explain the concept of polynomial rings and their properties.
- Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.

Year-III
Course Title: **Linear Algebra and Linear programming problems**
Paper- I
Paper Code-BM301
Status: Compulsory Course
Course Instructors: 1. Dr Preet Pal Singh, Associate Professor
2. Dr Sujata, Assistant Professor

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After Successful completion of this course, students will be able to:

- Explain the concept of linear transformation, rank, nullity and linear operators.
- Understand algebra of linear transformation.
- Find eigen value and eigen vector of different matrices and its application.
- Explain the concept of linear functionals, dual space and dual basis.
- Explain the basics of Operations Research.
- Solve linear programming problem by different method like Graphical, Simplex and duality.
- Formulation of transportation problem.

Course Title: **Complex Analysis**
Paper- II
Paper Code-BM302
Course Instructors: 1. Dr Sujata, Assistant Professor
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After Successful completion of this course, students will be able to:
- Understand the concept of complex variable, limit, continuity and differentiability;
- Know about analytic functions, Cauchy's Riemann; equations, harmonic functions;
- Know about complex integration, Cauchy's theorem, poles and singularities;
- Know about residues, the residues theorem, evaluation of improper real integral;
- Know about Liouville's theorem, Taylor's series and Laurent's series.

Course Title: **Numerical Analysis**

Paper- III

Paper Code-BM303

Course Instructors: 1. Dr Preet Pal Singh, Associate Professor

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After Successful completion of this course, students will be able to:
- Find Absolute, Relative, Percentage and general errors involved in calculations;
- Solve Algebraic and transcendental equations by Bisection method, False position method, Newton-Raphson method, Picard's iteration method;
- Check the consistency and inconsistency of system of linear equation;
- Find the solution of linear system of equations by direct and iterative methods;
- Find finite differences, differences of a polynomial and errors in polynomial interpolation;
- Apply Newton's forward and Backward interpolation formula, Gauss, Stirling, Bessel's, Everett's and Lagrange's interpolation formula;
- Numerically differentiate and numerically integrate a function by using a set of tabulated values of function.

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