Government College Bhoranj(Tarkwari)

District Hamirpur, Himachal Pradesh

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B. Sc. with Mathematics

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B.A. with Mathematics

Program Specific Outcomes (PSOs)

Students will be able to do the following by the end of the program:

PSO1 Use mathematics to address theoretical and applied problems through critical thinking, analysis, and synthesis.

PSO2 Able to learn Algebra, Calculus, Geometry, Differential Equations, and a variety of other fields of Mathematics. This also leads to the study of allied fields like as computer science, physical science, chemistry, and biology. As a result, this Program assists students in laying a solid basis for future study in mathematics.

PSO3 Capable of sharing thoughts and insights while seeking and benefiting from the expertise and insight of others. This teaches students how to be responsible in a quickly changing interconnected society.

PSO4 Model real-world situations mathematically and use the ensuing inferences to improve one's quality of life.

PSO5 Create mathematical ideas from basic axioms.

PSO6 Able to present Mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of Mathematics to non-mathematicians.

PSO7 Undergraduate students are expected to be deeply engaged in initial learning with the goal of thinking differently as agents of new knowledge, understanding, and applying new concepts in order to gain employability/self-employment.

PSO8 Able to qualify National-level exams including Banking exams, CDS, JAM, TIFR, HPPSC, UPSC, and others.

Program Outcomes (POs)

B.Sc. (Mathematics) First Year

Course Code : MATH101TH
Course Type: CORE COURSE
Name of the Course: Differential Calculus

Course Learning Outcomes:

After completing this course the learner should be able to

CO1 Find the higher order derivative of the product of two functions.

CO2 Expand a function using Taylor's and Maclaurin's series.

CO3 Conceive the concept of asymptotes and obtain their equations.

CO4 Have learnt the method of finding nth derivative and to use Leibnitz theorem.

CO5 Understood effectively the geometrical aspects of curvature, radius of curvature, involutes, evolutes of plane curves which are essential and elegant applications of differential calculus.

CO6 Understanding in handling functions of more than one variable for finding the maxima and minima of functions of two variables and Lagrange's multipliers for finding maxima and minima along with the given constants.

B.Sc. (Mathematics) First Year

Course Code : MATH102TH

Course Type: CORE COURSE
Name of the Course: Differential Equations

Course Learning Outcomes:

On successful completion of this course, the student will be able to

CO1 Obtain an integrating factor which may reduce a given differential equation into an exact one and eventually provide its solution.

CO2 Identify and obtain the solution of Clairaut's equation.

CO3 Fine the complementary function and particular integrals of linear differential equation.

CO4 Describe the origin of partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals.

CO5 Use Lagrange's method for solving the first order linear partial differential equation.

CO6 Solve and apply linear differential equations of second order (and higher).

CO7 To solve simultaneous and total differential equations, Lagrange's method.

CO8 To classify the second order partial differential equations: Parabolic, Elliptic and Hyperbolic.

B. Sc. (Mathematics) Second Year

Course Code : MATH201TH

Course Type: DISCIPLINE SPECIFIC ELECTIVE
Name of course : Real Analysis

Course Leaning Outcomes : On completion of course , students will be able to

CO1 Identify the difference between lub and glb.

CO2 Understand the concepts convergent sequence and Cauchy sequence.

CO3 Tests for absolute convergence and conditional convergence.

CO4 Develop the idea about limit of a function on the real line.

CO5 Apply the concepts of open sets and closed sets.

B. Sc. (Mathematics) Second Year

Course Code : MATH202TH

Course Type: DISCIPLINE SPECIFIC ELECTIVE
Name of course : ALGEBRA

Course Leaning Outcomes : After completing this course the learner should be able to

CO1 Assess properties implied by the definitions of groups .

CO2 Use various canonical types of groups (including cyclic groups and groups of permutations) .

CO3 Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups.

CO4 Analyze and demonstrate examples of ideals and quotient Groups.

CO5 Demonstrate understanding of the importance of homomorphism and isomorphism in groups.

CO6 Develop the idea about the rings, integral domain, field and ideal.

Class: B. Sc. Second Year (Major Mathematics)

Subject: Mathematics

Course Type: Skill Enhancement Course

Paper Code: MATH309TH

Title of Paper: Integral Calculus

Course Learning Outcomes

After the completion of the course, Students will be able to:

CO1 Demonstrate the ability to integrate knowledge and ideas of definite and indefinite integrals in a coherent and meaningful manner and use appropriate techniques for solving such problems .

CO2 To Calculate the areas of curved regions by using integration methods.

CO3 To Find the volume of a solid of revolution using various methods.

CO4 To Compare different integration methods for determining volume .

CO5 To Calculate the arc length of a curve and the surface area of a solid of revolution.

CO6 To evaluate double and triple integrals.

CO7 Apply change variable method to find the value of double and triple integral.

B.Sc. (Mathematics) Second Year

Course Code : MATH310TH

Course Type: Skill Enhancement Course

Name of course : Vector Calculus

Course Leaning Outcomes : On completion of this area of course , students will be able to

CO1 Find the Triple product of Products and their Applications.

CO2 Deduce the Vector equations subject to different conditions.

CO3 Understand the applications of vector algebra (particularly, vector products) to geometry and mechanics — concurrent forces in a plane, theory of couples, system of parallel forces.

CO4 Learn operations with vector-valued functions.

CO5 Find the limits and verify continuity of vector functions.

CO6 Differentiate and integrate vector functions of one variable.

B.Sc. (Mathematics) Third Year

Course Code : MATH303TH

Course Type: DISCIPLINE SPECIFIC ELECTIVE
Name of the Course : LINEAR ALGEBRA

Course Learning Outcomes: Upon completion of this course, students should be able to:

CO1 Understand the idea about vector space and metric space.

CO2 Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces.

CO3 Compute with the characteristic polynomial, eigenvectors, eigenvalues and Eigen spaces.

B.Sc. (Mathematics) Third Year

Course Code : MATH304TH

Course Type: DISCIPLINE SPECIFIC ELECTIVE
Name of the Course : Numerical Methods

Course Learning Outcomes: On successful completion of this course, the student will be able to

CO1. Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.

CO2. Understand the difference operators and the use of interpolation.

CO3. Understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.

CO4. Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.

CO5. Apply numerical methods to obtain approximate solutions to mathematical problems .

CO6. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

CO7. Analyse and evaluate the accuracy of common numerical methods.

B.Sc. (Mathematics) Third Year

Course Code : MATH313TH

Course Type: Skill Enhancement Course

Name of the Course: Probability and Statistics

Course Learning Outcomes:

After the successful completion of this course, it is indented that a student will be able to:

CO1 Use the basic probability rules, including additive and multiplicative law by using the Concept of probability set function, random variable, the probability density function.

CO2 Distribution function and use these concept for calculating probabilities and drive the marginal/conditional distribution and their respective mean, variance and standard deviation.

CO3 Mathematical expectation, moments, moment generating function, characteristic function, discrete distributions: uniform.

CO4 Applications of Binomial distribution, Poisson distribution, continuous distribution, normal distribution and exponential distribution .

CO5 Problems on Joint cumulative distribution function and its properties.

CO6 Problems on joint probability density functions, marginal and conditional distributions.

CO7 Problems on expectation of function of two random variables, conditional expectations, independent random variables.

B.Sc. (Mathematics) Third Year

Course Code : MATH316TH

Name of the Course: Theory of Equations

Course Type: Skill Enhancement Course

Course Learning Outcomes: On successful completion of this course, the student will be able to

CO1 Describe the relation between roots and coefficients .

CO2 Find the sum of the power of the roots of an equation using Newton's Method.

CO3 Transform the equation through roots multiplied by a given number, increase the roots, decrease the roots, removal of terms

CO4 Solve the reciprocal equations.

CO5 Analyse the location and describe the nature of the roots of an equation.