



# Government Gajanan Madhav Muktibodh College Sahaspur Lohara Dist- Kabirdham (C.G.)

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## Programme Outcomes: B. Sc (Mathematics Group)

After successful completion of three-year degree program in Maths, Physics and computer science a student should be able to;	
PO-1.	Provides basic knowledge on core concepts of Science.
PO-2	Demonstrate, solve and an understanding of major concepts in all disciplines of physics, mathematics, computer science.
PO-3.	Students will be prepared for a career in an information technology oriented business or industry.
PO-4.	Empowered with analytical mind and critical thinking.
PO-5.	Students developed their experimental and data analysis skills through experiments at laboratories.
PO-6.	Ability to solve problems using programming languages and software tools.
PO-7.	To inculcate the scientific temperament in the students and outside the scientific community.



## DEPARTMENT OF MATHEMATICS

### **Programme Specific Outcomes: B. Sc Mathematics.**

PSO-1.	Gain the knowledge of mathematics problem-solving in easy to learning of mathematics .
PSO-2.	Use the geometrical box, compass box ruler, chalk duster black board etc .
PSO-3.	Problem solving better represents the nature of mathematics.
PSO-4.	Good problem solving activities provide an entry point that allows all students to be working on the same problem.
PSO-5.	Problem-solving allows students to develop understanding and explain the processes used to arrive at solutions, rather than remembering and applying a set of procedure.

### **Course Outcomes B. Sc I Mathematics**

<b>Course Outcomes</b>	<b>After completion of these courses students should be able to</b>
<b>CH-1</b> <b>Algebra and trigonometry.</b> (paper code - 0798)	<p>CO-1. Symmetric, , Hermitian and skew hermitian, matrices. Eigen values, Eigen vectors and the characterstic equations of a matrix.</p> <p>CO-2. Application of Matrices to a system of linear (both homogeneous and nonhomogeneous) equations. Solutions of cubic equations (Cardons Method), Biquadratic equation.</p> <p>CO-3. Mappings, Equivalence relations and partitions. Congruence modulo. Even and odd permutations the alternating groups. Cayley's theorem.</p> <p>CO-4. Homomorphism and Isomorphism the fundamental theorems of homomorphism. Subsings, Integral domain and fields Characterstic of a ring and field.</p> <p>CO-5. De Moivres theorem and its applications. Expansion of Trigonometrical functions. Gregory's series. Summation of series.</p>
<b>CH-2</b>	<p>CO-1. <math>\epsilon - \delta</math> definition of the limit of a function. Basic properties of limits. Differentiability. Maclaurin and Taylor series expansions.</p>



<b>Calculus.</b> (paper code - 0799)	CO-2. Asymptotes curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates  CO-3. Integration of irrational algebraic functions and transcendental Rectification. Volumes and surfaces of solids of revolution.  CO-4. Degree and order of a differential equation. E Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.  CO-5 Linear differential equations of second order. Ordinary simultaneous differential equations.
<b>CH-3</b> <b>Vector analysis and geometry.</b> (paper code - 0800)	CO-1. Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector differentiation. Gradient, divergence and curl.  CO-2 Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.  CO-3 General equation of second degree. Tracing of conics. System of conics. Confocal conics. Polar equation of a conic.  CO-4 Plane the Straight line and the plane. Sphere cone. Cylinder.  CO-5 Central Conicoids. Paraboloids. Plane sections of conicoids.

### Course Outcomes B. Sc II Mathematics

<b>CH-1</b> <b>Advanced calculus</b>	CO-1. Definition of a sequence, Ratio tests, De-Morgan and Bertrand's tests, Cauchy's integral tests.  CO-2. Continuity, Chain rule of differentiability, Taylor's theorem with various forms of remainders.  CO-3. Limit and continuity of functions of two variables, Taylor's theorem for functions of two variables.  CO-4. Envelopes, Evolutes, Maxima, minima and saddle points of functions.  CO-5. Beta and Gamma functions, Double and triple integrals, Change of order of integration in double integral.
<b>CH-2</b> <b>Differential</b>	CO-1. Series solutions of differential equations, Reality of Eigen values.  CO-2. Laplace Transformation, Shifting theorems, Laplace transforms of



<b>Equation .</b>	<p>derivatives,</p> <p>CO-3. Partial differential equations of the first order, Lagrange's solution, Charpit's general method of solution.</p> <p>CO-4. Partial differential equations of the second and higher orders, Monge's methods.</p> <p>CO-5. Calculus variations, Euler's equation undercoordinates transformations.</p>
<b>CH-3 Mechanics</b>	<p>CO-1. . Analytical conditions of equilibrium, Virtual work, Catenary.</p> <p>CO-2. Forces in three dimensions, Poinso't's central axis, Null lines and planes. Forces in three dimensions, Poinso't's central axis, Null lines and planes.</p> <p>CO-3. Simple harmonic motion, Elastic strings, Projectile, Central orbits.</p> <p>CO-4. Kepler's laws of motion, Velocities and acceleration in tangential and normal directions.</p> <p>CO-5. . Motion in a resisting medium, Motion of a particle in three dimensions.</p>

### Course Outcomes B. Sc III Mathematics

<b>CH-1</b>  <b>Analysis.</b>  (paper code 0898)	<p>CO-1. Series of arbitrary terms, Fourier series, Fourier expansion of piecewise monotonic functions.</p> <p>CO-2. Riemann integral, Comparison test. Abel's and Dirichlet's tests.</p> <p>CO-3. Complex number as ordered pairs, Mobius transformations. Conformal mappings.</p> <p>CO-4. Definition and examples and metric spaces, Real numbers as a complete ordered field.</p> <p>CO-5. Dense subsets, Baire category theorem, Uniform continuity. Compactness.</p>
<b>CH-2 .</b>  <b>Abstract</b>	<p>CO-1. Group Automorphism, inner automorphism, Conjugacy. Relations.</p> <p>CO-2. Ring theory-Ring homomorphism, Polynomial Rings. Polynomials over the Rational Field.</p> <p>CO-3. Definition and examples of vector space, Existence of</p>



Algebra (paper code 0899)	complementary of sums of subspace.  CO-4. Linear transformations and representative as matrices, Quadratic and Hermitian forms.  CO-5. Inner Product space-schwartz, Orthogonal vectors Orthogonal Complements.
CH-3 Discrete mathematics. (paper code- 0901).	CO-1. Sets and Propositions, Cardinality, mathematical, Principle of inclusions and exclusion.  CO-2. Relations and Functions ,Binary Relations and Partitions.  CO-3. Finite state Machines ,Equivalent Machines, Discrete numbers.  CO-4. Recurrence Relations and Recursive algorithms, Groups and Rings.  CO-5. Boolean Algebras, Lattices and Algebraic, Boolean Functions and Expressions.

PRINCIPAL  
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**Programme Specific Outcomes***A graduate with B.Sc. in physics will have the ability to:*

PSO-1.	Gain the knowledge of Physics through theory and practical.
PSO-2.	Read, understand and interpret physical information - verbal, mathematical and graphical.
PSO-3	Use modern physical tools, Models, Charts and Equipments.
PSO-4	Understand good laboratory practices and safety.
PSO-5	Develop research oriented skills.
PSO-6	Make aware and handle the sophisticated instruments/equipments.

**Course Outcomes: B.Sc.- I Physics**

Course Code	Course Name	Course Outcomes
Paper- I (Code- )	<b>Mechanics</b>	<p>Co-1. Understand laws of motion and their application to various dynamical situations, motion of inertial frames and concept of galilean invariance. He/ she will learn the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.</p> <p>CO-2 understand the analogy between translational and rotational dynamics, and application of both motions simultaneously in analyzing rolling with slipping.</p> <p>CO-3 Understand the phenomena of collisions and idea about center of mass and laboratory frames and their correlation.</p> <p>CO-4 Understand simple principles of fluid flow and the equations governing fluid dynamics.</p> <p>CO-5 Apply Kepler's law to describe the motion of planet's and satellite in circular orbit, through the study of law of gravitation.</p> <p>CO-6 Describe how fictitious force arise in a non Inertial frame, e.g., why a person sitting in a Jerry to round experiences an outward pull.</p>



		<p>CO-7 Describe special relativistic effects and their effects on the mass and energy of a moving object.</p> <p>CO-8 Appreciate the nuances of special theory of relativity ( STR).</p>
Paper-II (Code- )	Electricity and magnetism	<p>CO-1 Demonstrate gauss law, coulombs law for the electric field, and apply it to systems of point charges as well as line, surface and volume distribution of charges.</p> <p>CO-2 Explain and differentiate the vector ( electric fields, coulombs law) and scalar ( electric potential, electric potential energy) formalisms of electrostatics.</p> <p>CO-3. Apply gauss law of electrostatics to solve a variety of problems.</p> <p>CO-4. Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.</p> <p>CO-5 Demonstrated a working understanding of capacitors.</p> <p>CO-6 Describe the magnetic field produced by magnetic dipoles and electric currents.</p> <p>CO-7 Explain Faraday - lenz and Maxwell laws to articulate the relationship between electric and magnetic fields.</p> <p>CO-8 Apply kirchhoffs rules to analyze ac circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.</p> <p>CO-9 In the laboratory course the student will get an opportunity to verify various laws in electricity and magnetism such as lenzs law, faradays law and learn about the construction, working of various measuring instruments.</p>
Practical Paper (Code- )		<p>1. About accuracy and precision, different types of errors and statistical analysis of data.</p> <p>2. About noise and signal, signal to noise ratio. Different types of noise and their identification.</p> <p>3. This course will help in understanding basic concepts of electricity and magnetism and their applications.</p>

**Course Outcomes: B.Sc.- II physics**




Paper Code	Course Name	Course Outcomes
Paper-I (Code- )	thermal physics	<p><i>After completing this course, students will be able to:</i></p> <p>CO-1. Completed the basic concepts of thermodynamics, the first the second law of thermodynamics.</p> <p>CO-2 the concept of entropy and the associated therems, the thermodynamics potentials and their physical interpretations.</p> <p>CO-3 Learn the basic aspects of kinetic theory of gases, maxwell-boltzman distribution law, equation of energies mean free path of molecular collision.</p> <p>CO-4 Learn about Maxwell thermodynamics relations.</p>
Paper-II (Code- )	Wave optics. and	<p>CO-1 Recognize and use a mathematical oscillator equation and wave equation, and derive these equation for certain systems.</p> <p>CO2- Apply basic knowledge of principals and theories about the behavior of light and the physical environment to conduct experiment.</p> <p>CO- 3Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.</p> <p>CO-4 use the principal of wave motion and supeposition.</p> <p>CO-5 the motion of coupled oscillators , study of lissajous figure and behavior of Thamverse.</p>
Practical Work (Code- )	study of wave optics and diffraction.	<p>CO-1. Study of diffraction.</p> <p>CO-2.Comperative study of optics.</p>

### Course Outcomes: B.Sc.- III physics

Paper Code	Course Name	Course Outcomes
Paper-I (Code- )	Quantum mechanics and application.	<p>CO- 1 after an exposition of inadequacies of classical mechanics in explaining microscopic phenomena, quantum theory formulation.</p> <p>CO-2 The interpretation of wave function of quantum particle and probabilistic nature of its location.</p>



		<p>CO- 3 Through understanding the behavior of quantum particles.</p> <p>CO-4 study of influence of electric and magnetic field on atoms will help in understanding stark effect and zeeman effect.</p> <p>CO-5 this basic course will form a firm basis to understand quantum many body problems.</p>
<b>Paper-2(code-)</b>	Analog system and application	<p>CO-1 N- type and P- type semiconductors, mobility, drift velocity, fabrication of PN junctions. Forward and reverse biased junction.</p> <p>CO-2 biasing and equivalent circuits, coupled amplifiers.</p> <p>CO-3 Operational amplifiers and knowledge about different configuration namely inverting and non inverting.</p> <p>CO 4- study of computer.</p> <p>CO- 5 study about LED, diode, transistor, zener diode.</p>
<b>Practical Work</b>	. Study about different circuits	<p>1. N and P semiconductor.</p> <p>2 application of PN junction</p> <p>3 different types of diode.</p>

  
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