

**TAMRALIPTA MAHAVIDYALAYA**  
**Tamluk, Purba Medinipur**

**DEPARTMENT OF MATHEMATICS**

**Programme: B.Sc. Mathematics**

**Programme Specific Outcomes (PSOs) for B.Sc. Mathematics (Honours)**

<b>SL NO.</b>	<b>On Completing B.Sc. Mathematics Honours Programme, the learners will be able to</b>
<b>PSO1</b>	<b>Foundation in Knowledge:</b> Bachelor in Mathematics is the result of the in-depth knowledge of many basic branches of mathematics, namely, Calculus, Differential Equations, Algebra, Geometry, Mechanics, Real and Complex Analysis, Metric spaces, Number theory, Graph Theory including some associated fields like Statistics.
<b>PSO2</b>	<b>Competency in Skills:</b> The acquired abilities and knowledge have inherent beauty, resulting in competency in analytical thinking, critical comprehension, analysis, and synthesis to address several theoretical and as well as various practical problems
<b>PSO3</b>	<b>Problem Solving Skills:</b> Students in this curriculum learn to challenge statements logically, spot patterns, and differentiate between important and irrelevant components of situations.
<b>PSO4</b>	<b>Interdisciplinary and Research Skills:</b> Students who successfully complete this course will be able to communicate mathematics clearly and accurately, formulate abstract ideas in mathematical notation, describe mathematical ideas from multiple perspectives, and identify important mathematical concepts to non-mathematicians.
<b>PSO5</b>	<b>.Proficiency in Employments:</b> This programme will assist students in improving their employability for government employment, banking, insurance, and investment occupations, data analysis jobs, and other public and private sector jobs.

### Course Outcomes (COs): B.Sc. Mathematics (Honours)

S E M E S T E R - I	<b>Course Title:</b> <b>Calculus, Geometry &amp; Differential Equation</b>		<b>On completing the course the learners will be able to-</b>
	<b>Code: Major-1</b>  <b>Credits-4</b>	CO1	Topics on Application of Calculus help us to study about curves and properties of curves like concavity, convexity and tendency of bending.
		CO2	It motivates students to develop the physical concepts (like velocity and acceleration of a moving particle).
		CO3	Reduction formulae help to calculate higher integration.
		CO4	ODEs are used in many models to determine how the state of this model is changing
		CO5	Demonstrate an intuitive and computational understanding of ODE by solving a variety of application problems arising from biology, chemistry, physics, engineering, and economics.
		CO6	Analytical Geometry helps students to understand the geometry of a general equation of second degree in two or three variables.
	<b>Course Title:</b> <b>Matlab (Practical)</b>	CO1	Understanding of MATLAB Environment: Familiarity with the MATLAB software environment, including its features, commands, and help system.
	<b>Code: SEC-1</b>  <b>Credits-3</b>	CO2	Problem-Solving Skills: Ability to apply a top-down, modular, and systematic approach to design, write, and test MATLAB programs to achieve computational objectives.
		CO3	Data Analysis and Visualization: Proficiency in using MATLAB to analyze and visualize data effectively.
		CO4	Numerical Techniques: Competence in applying numeric techniques and simulations to solve engineering-related problems.
		CO5	Data Structures Knowledge: In-depth understanding and use of MATLAB fundamental data structures such as classes, structure arrays, and cell arrays.
		CO6	Plotting and Graphics: Skills to create and control simple plots and user-interface graphics objects in MATLAB, including 2D and 3D plotting.
CO7		Toolbox Utilization: Ability to understand and use MATLAB Toolboxes for solving real-life problems	
<b>Course Title:</b> <b>Calculus, Geometry &amp; Differential</b>	CO1	Topics on Application of Calculus help us to study about curves and properties of curves like concavity, convexity and tendency of bending.	
	CO2	It motivates students to develop the physical concepts (like velocity and acceleration of a moving particle).	

	<b>Equation</b>	CO3	Reduction formulae help to calculate higher integration.
	<b>Code: Minor-1</b>	CO4	ODEs are used in many models to determine how the state of this model is changing
		CO5	Demonstrate an intuitive and computational understanding of ODE by solving a variety of application problems arising from biology, chemistry, physics, engineering, and economics.
		CO6	Analytical Geometry helps students to understand the geometry of a general equation of second degree in two or three variables.
<b>S E M E S T E R -II</b>	<b>Course Title: Algebra</b>	CO1	Define and interpret complex numbers, application of De Moivre's Theorem.
	<b>Code: Major-2</b>	CO2	Represent complex numbers algebraically and geometrically.
		CO3	Solve polynomial equations up to degree 4, location and nature of the roots of algebraic equation.
		CO4	Define equivalence relation, partition into equivalence class.
		CO5	Produce rigorous arguments (proofs) centered on the material of number theory, most notably in the use of Mathematical Induction and/or the Well Ordering Principle in the proof of theorems.
		CO6	Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime-factorization.
	<b>Course Title: Matlab (Practical)</b>	CO1	MATLAB Programming: Gain proficiency in writing scripts and functions using M-files, and develop the ability to create user-defined functions including primary, sub, and private functions.
	<b>Code: SEC-2</b>	CO2	Control Flow Proficiency: Understand and apply flow control statements to direct the execution flow of MATLAB programs.
		CO3	Data Manipulation Expertise: Learn to manipulate data using MATLAB's standard array and matrix library functions.
		CO4	Advanced Function Usage: Acquire skills to use advanced function concepts like eval, function handles, and anonymous functions for dynamic programming.
		CO5	Data Import/Export Skills: Become adept at importing and exporting data, reading from and writing to spreadsheets, and managing MAT-files.
		CO6	Curve Fitting and Data Analysis: Learn to fit curves to data sets and perform data analysis using MATLAB's built-in functions.
CO7		Graphical Representation Ability: Develop the ability to plot various types of graphs, including 2D and 3D plots, multiple plots, matrix plots, polar plots, and surfaces of revolution.	



### **Programme Specific Outcomes (PSOs) for B.Sc. Mathematics (General)**

<b>SL NO.</b>	<b>On Completing B.Sc. Mathematics General Programme, the learners will be able to</b>
<b>PSO1</b>	<b>Foundation in Knowledge:</b> Bachelor in Mathematics is the result of the in-depth knowledge of many basic branches of mathematics, namely, Calculus, Differential Equations, Algebra, Geometry, Mechanics, Real and Complex Analysis, Metric spaces, Number theory, Graph Theory including some associated fields like Statistics.
<b>PSO2</b>	<b>Competency in Skills:</b> The acquired abilities and knowledge have inherent beauty, resulting in competency in analytical thinking, critical comprehension, analysis, and synthesis to address several theoretical and as well as various practical problems
<b>PSO3</b>	<b>Problem Solving Skills:</b> Students in this curriculum learn to challenge statements logically, spot patterns, and differentiate between important and irrelevant components of situations.
<b>PSO4</b>	<b>Interdisciplinary and Research Skills:</b> Students who successfully complete this course will be able to communicate mathematics clearly and accurately, formulate abstract ideas in mathematical notation, describe mathematical ideas from multiple perspectives, and identify important mathematical concepts to non-mathematicians.
<b>PSO5</b>	<b>.Proficiency in Employments:</b> This programme will assist students in improving their employability for government employment, banking, insurance, and investment occupations, data analysis jobs, and other public and private sector jobs.

### Course Outcomes (COs): B.Sc. Mathematics (General)

S E M E S T E R -I	<b>Course Title:</b>		<b>On completing the course the learners will be able to-</b>
	<b>Calculus, Geometry &amp; Differential Equation</b>	CO1	Topics on Application of Calculus help us to study about curves and properties of curves like concavity, convexity and tendency of bending.
	<b>Code: MDC-1</b>	CO2	It motivates students to develop the physical concepts (like velocity and acceleration of a moving particle).
	<b>Credits-4</b>	CO3	Reduction formulae help to calculate higher integration.
		CO4	To learn about continuity and differentiability of a real function.
		CO5	To study concept of sequence and series and hence find sum of infinite terms with different methods.
		CO6	To learn about limit of a function.
S E M E S T E R -II	<b>Course Title:</b>	CO1	Define and interpret complex numbers, application of De Moivre's Theorem.
	<b>Algebra</b>	CO2	Represent complex numbers algebraically and geometrically.
	<b>Code: MDC-2</b>	CO3	Solve polynomial equations up to degree 4, location and nature of the roots of algebraic equation.
	<b>Credits-4</b>	CO4	Define equivalence relation, partition into equivalence class.
		CO5	Produce rigorous arguments (proofs) centered on the material of number theory, most notably in the use of Mathematical Induction and/or the Well Ordering Principal in the proof of theorems.
		CO6	Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime-factorization.