

Department of Mathematics
Haldia Government College
(Affiliated to Vidyasagar University)

Programme Specific Outcome (PSO) & Course Outcome (CO)

Name of the Programme: BACHELOR OF SCIENCE (HONOURS) MAJOR IN
MATHEMATICS (Under CCFUP, NEP)

Year of Introduction: 2023-24

Programme Specific Outcome (PSO):

Learners will grow a concrete base in the key concepts, methods, and theories of mathematics, enabling them to pursue additional lessons in the field or apply mathematical perceptions to several academic and professional areas. This programme (even though whole syllabus has not been circulated by Vidyasagar University) goals to offer learners with a comprehensive knowledge of mathematics. Since the introduction of the New Education Policy guided course, additional effort is made to confirm that students have the skills they need to grip the material and develop their research ability. Succeeding the termination of the course, students should have the subsequent knowledge:

- Make out the interdisciplinary nature of mathematics and its relations with other relevant disciplines like physics, statistics, chemistry etc.
- Evaluate the development of mathematical thought and techniques, mainly in the perspectives of pure and applied mathematics.
- Demonstrate understanding of analysis, algebra, geometry and its applications in other subjects as well as in practical life.
- Recognize the importance of practical application in our daily life.
- The necessary groundwork for autonomous research.

After completing B.Sc in mathematics a lot of students pursue postgraduate studies leading to a M.Sc in Pure Mathematics, Applied mathematics or sometimes in Statistics under various state universities, IIT, NIT, ISI, IISC, through competitive examinations like JAM or undergraduate marks.. A percentage of the pupils would study for exams linked to the other Govt. services. Mathematics is a main choice among candidates looking for state-level jobs such as West Bengal Civil Service Examination (WBCS) and administrative services such as Indian Administrative Service (IAS), School service commission (SSC), PSC etc.

Course Outcome (CO):

MATHEMATICS MAJOR

MJ-1T: Calculus, Geometry & Ordinary Differential Equation (Theory) (Credits: 04)

Commented [a1]:

Commented [a2R1]:

After fruitful completion this course, pupils will be capable to:

Comprehend the Fundamentals of Mathematics

- Understand the definition, aims, and scope of mathematics.
- Discriminate and describe the three key fields of mathematics: Calculus, Geometry & Differential Equation

Integrate Interdisciplinary Knowledge

- Make out the unique structures of mathematics and its intersections with other relevant disciplines such as physics, statistics and chemistry.
- Apply interdisciplinary approaches to mathematical study and research.

Analyze Calculus

- Define and outline the aims and scope of differential and integral calculus.
- Understand the higher order differentiation of some well-known functions and integration using reduction formulae.
- Conduct tracing of different well known curves.
- Classify, distribute, and describe the features of living primates.
- Understand the basics of paleo-environmental and geomorphological classifications.

Explore two and three dimensional geometry

- Define and clarify the aims and scope of geometry.
- Discuss the various types of geometrical 2D and 3D problems.
- Analyse the classification of different geometrical figure from its equation.

Examine basic ideas in ordinary differential equation(ODE)

- Define and explain the aims and scope of ODE.
- Understand the different types of differential equation and its solution.

Through these outcomes, students will develop a comprehensive foundation in mathematics, preparing them for advanced lessons and diverse professional tracks within the arena.

MJ-2T: Algebra (Credits: 04)

Upon successful completion of this course, students will be able to:

Understand Complex number, Inequality and theory of equations

- Explain the polar representation of complex number and nth root of unity, De Moivre's theorem and its applications.
- Explain the fundamental theorems related to theory of equation such as Sturm's theorem, Descartes's rule of sign etc. and its application in finding roots of an algebraic equation.
- Comprehend the difference between of AM, GM, HM and their relation.

Examine basic ideas of Modern (abstract) Algebra

- Understand the concept like relation, functions, invertible functions,
- Explore the concept of cardinality of a set and well ordering principle
- Understand and differentiate concepts like congruence relation principle of mathematical induction etc.

Explore basic ideas of matrix and vector space

- Study the effect of row and column operation on a matrix and determinant and finding

the solution of system of linear equations.

- Understand the concept vector space and linear transformation, eigen value , Eigen vector and use of Cayley Hamilton's theorem to find out the inverse of a matrix.

These results will equip students with introductory knowledge and analytical abilities essential for innovative studies in mathematics.

SEC 1P: MATLAB-1 (Practical) (Credits: 3)

Upon effective completion of this practical course, students will be able to:

- Understand M-file scripts and functions, flow control statements, standard array library functions and its use in mathematics.
- Import and export data, read spread data sheet, MAT-file.
- Conversion one number system to another number system using MATLAB.
- Find root, eigen values eigen vectors of a matrix..
- Verify different important theorem such as Bolzano-Weierstrass theorem through plotting of sequence.

SEC 2P: MATLAB-2 (Practical) (Credits: 3)

Upon successful completion of this practical course, students will be able to:

Upon effective completion of this practical course, students will be able to:

- Understand the software MATLAB and its use in mathematics.
- Explore the concept of MATLAB interface, data types, variables, flow control statements, arrays, mathematical library functions, input and output functions etc.
- Find the sum, product , max min of a list of number in an array using MATLAB.
- Plot the two dimensional graph such as trochoid, cycloid, epicycloid, hypocycloid etc.
- Sketch the three dimensional curves ellipsoid , hyperboloid of one sheet and two sheets, elliptic cone, elliptic paraboloid, elliptic paraboloid using Cartesian coordinates

These outcomes will equip students with both theoretical knowledge and practical skills necessary to analyze, evaluate, and contribute to development programmes and policies effectively, preparing them for roles in development planning, policy analysis, and implementation.

MATHEMATICS MINOR

M1-1T: Calculus, Geometry & Ordinary Differential Equation (Theory) (Credits: 04)

After fruitful completion this course, pupils will be capable to:

Comprehend the Fundamentals of Mathematics

- Understand the definition, aims, and scope of mathematics.
- Discriminate and describe the three key fields of mathematics: Calculus, Geometry & Differential Equation

Integrate Interdisciplinary Knowledge

- Make out the unique structures of mathematics and its intersections with other relevant disciplines such as physics, statistics and chemistry.
- Apply interdisciplinary approaches to mathematical study and research.

Analyze Calculus

- Define and outline the aims and scope of differential and integral calculus.
- Understand the higher order differentiation of some well-known functions and integration using reduction formulae.
- Conduct tracing of different well known curves.
- Classify, distribute, and describe the features of living primates.
- Understand the basics of paleo-environmental and geomorphological classifications.

Explore two and three dimensional geometry

- Define and clarify the aims and scope of geometry.
- Discuss the various types of geometrical 2D and 3D problems.
- Analyse the classification of different geometrical figure from its equation.

Examine basic ideas in ordinary differential equation(ODE)

- Define and explain the aims and scope of ODE.
- Understand the different types of differential equation and its solution.

Through these outcomes, students will develop a comprehensive foundation in mathematics, preparing them for advanced lessons and diverse professional tracks within the arena.

M1-2T: Algebra (Credits: 04)

Upon successful completion of this course, students will be able to:

Understand Complex number, Inequality and theory of equations

- Explain the polar representation of complex number and nth root of unity, De Moivre's theorem and its applications.
- Explain the fundamental theorems related to theory of equation such as Sturm's theorem, Descartes's rule of sign etc. and its application in finding roots of an algebraic equation.
- Comprehend the difference between of AM, GM, HM and their relation.

Examine basic ideas of Modern (abstract) Algebra

- Understand the concept like relation, functions, invertible functions,
- Explore the concept of cardinality of a set and well ordering principle
- Understand and differentiate concepts like congruence relation principle of mathematical induction etc.

Explore basic ideas of matrix and vector space

- Study the effect of row and column operation on a matrix and determinant and finding the solution of system of linear equations.
- Understand the concept vector space and linear transformation, eigen value , Eigen vector and use of Cayley Hamilton's theorem to find out the inverse of a matrix.

These results will equip students with introductory knowledge and analytical abilities essential for innovative studies in mathematics.

