# Program Outcome (PO) and Course Outcome (CO) under LOCF/NCCF

## Program Offered: B.Sc in Mathematics

| Program Outcomes (PO) | |
|---|---|
| PO1 | Gain a strong knowledge in different areas of mathematics and solve real life problems by constructing and solving mathematical models. |
| PO2 | Acquire numerical skill and logical thinking and apply the enfacing competitive examinations, internships with confidence. |
| PO3 | Gain scientific knowledge and skills which enables them to undertake further studies in Mathematics, Statistics or its allied areas. |
| PO4 | Pursue research in the field of Mathematics, Engineering, Information Technology, Computer Science and Social Science |
| PO5 | Apply knowledge of principles, concepts, and results in specific subject area to analyse their impact both locally and globally. |
| PO6 | Enhance problem-solving skills to resolve day to day problems. |

## Programme Specific Outcomes

| PROGRAMME NAME | B.Sc Programme in Mathematics |
|---|---|
| PSO | **"The laws of nature are but the mathematical thoughts of God"** by Euclid. **"Mathematics is the language of all sciences**." So, we encourage each student for higher study and try to understand the beauty of the subject. Mathematics is the only subject which supports both pure and social sciences to develop their areas. Mathematics is also used as a tool to simplify and solve different complicated problems in our modern life. Without Mathematics, any progress is not possible So, we can say "**Mathematics for all".** |

# List of course outcomes

| Semester | Course Code | Course Name | Year of Introduction | Course outcome |
|---|---|---|---|---|
| I | BSCMTMMJ101 | Classical Algebra, Calculus and Analytical Geometry | 2023 | In this course we teach basic application of calculus and geometry of two and three dimensions. We also teach the method of solving first order linear and non-linear differential equations along with some applications in geometry and mechanics. |
| | BSCMTMSE101 | Graph Theory | 2023 | In this course, we understand the concept of graphs, which is an important tool for mathematical modeling, different types of graphs, and operations on graphs. We also relate real-life problems or events with mathematical graphs and understand the concept of trees and algorithms to find special spanning trees. |
| | MDC113 | Business Mathematics | 2023 | In this course we teach basic application of basic mathematics related to life. We also teach the method of solving different arithmetic problems. |
| II | BSCMTMMJ201 | Linear Algebra I, Ordinary Differential Equations and Vector Calculus | 2024 | Basic differential equations, complex numbers, theory of equations, some basic inequalities, fundamentals of number theory and some properties of matrices along with its applications are taught in this course. |
| | BSCMTMSE201 | Mathematical Tools and Latex | 2024 | In this course, students understand programming language and can solve problems using LaTeX programming software. Also, they will use this software to enhance their mathematical skills. By the end of the course, students will be equipped with the tools necessary to tackle various mathematical challenges and effectively communicate their solutions using LaTeX. |
| | MDC201 | Mathematical Science | 2024 | In this course we teach basic application of basic mathematics related to life. We also teach the method of solving different arithmetic problems |
| | BSCMTMMN101 | Classical Algebra, Calculus and Analytical Geometry | 2023 | In this course we teach basic application of calculus and geometry of two and three dimensions. We also teach the method of solving first order linear and non-linear differential equations along with some applications in geometry and mechanics. |
| | BSCMTMMN201 | Linear Algebra I, Ordinary Differential Equations and Vector Calculus | 2024 | Students learn vector spaces and their associated theorems are able to solve related problems, know linear transformation, its rank and nullity, and learn the algebra of linear transformation and its matrix representation. Also, their knowledge is enhanced by solving problems of linear algebra. |

| Semester | Course Code | Course Name | Year of Introduction | Course outcome |
|---|---|---|---|---|
| III | BSCHMTMC301 | Theory of Real Functions & Introduction to Metric Spaces | 2019 | We acquaint our students about some properties of limit, continuity, differentiability and its application for real valued function. We also teach mean value theorems, expansion of functions and some basic properties of metric spaces in this course. |
| | BSCHMTMC302 | Group Theory I | 2019 | In this topic, we teach basic concepts of groups, subgroups, cyclic groups and normal subgroups. Furthermore, direct product of finite number of groups, factor groups, group homeomorphisms, isomorphism along with applications are taught in this module. |
| | BSCHMTMC303 | Numerical Methods & Numerical Methods Lab | 2019 | In this topic, we teach interpolation, numerical differentiation, numerical integration, solution of transcendental and polynomial equations, solution of system of linear algebraic equations and solutions of ordinary differential equations. |
| | BSCHMTMSE301 | Logic and Sets | 2019 | In this skill enhancement course, we acquaint our students about some basic logic, propositional calculus, sets, subsets and different types of set operations. |
| | BSCHMTMSE302 | Programming Language in C | 2019 | In the practical paper, we teach preliminary concepts of C-Language and teach how to solve some numerical problems using C. |

| Semester | Course Code | Course Name | Year of Introduction | Course outcome |
|---|---|---|---|---|
| IV | BSCHMTMC401 | Riemann Integration and Series of Functions | 2020 | In this core course, we introduce Riemann integration and its different properties, improper integral and convergence of Beta-Gamma function. Further, sequence of functions, series of functions, Fourier series, power series and their uniform convergence are also taught |
| | BSCHMTMC402 | Multivariate Calculus | 2020 | Functions of several variables, limit continuity, differentiability, chain rule, extrema of functions, double integral, triple integral, Greens, Gauss and Strokes theorem are t |
| | BSCHMTMC403 | Ring Theory and Linear Algebra I | 2020 | In this course, we teach rings, subrings, integral domain, fields, ideal, ring homomorphisms and isomorphism theorems |
| | BSCHMTMSE401 | Graph Theory | 2020 | We taught Eulerian circuits, Eulerian graphs, Hamiltonian cycles, representation of a graph by matrix. Some applications of this topic like Travelling salesman's problem, shortest path are also taught here |
| | BSCHMTMSE402 | Object Oriented Programming in C++ | 2020 | In the practical paper, we teach preliminary concepts of C-Language and teach how to solve some numerical problems using C. |

| Semester | Course Code | Course Name | Year of Introduction | Course outcome |
|---|---|---|---|---|
| V | BSCHMTMC501 | Set Theory and Metric Spaces | 2018 | We acquaint our students about some properties of limit, continuity, differentiability and its application for real valued function. We also teach mean value theorems, expansion of functions and some basic properties of metric spaces in this course. |
| | BSCHMTMC502 | Advanced Algebra | 2018 | Complex numbers, theory of equations, some basic inequalities, fundamentals of number theory and some properties of matrices along with its applications are taught in this course. |
| | BSCHMTMDSE501 | Tensors & Differential Geometry | 2018 | In this course we teach basic application of tensor calculus and geometry of two and three dimensions. We also teach the method of solving first order linear and non-linear differential equations along with some applications in geometry and mechanics. |
| | BSCHMTMDSE503 | Linear Programming and Game Theory | 2018 | It is a special case of mathematical programming. Formerly, it is a technique for optimization of a linear objective function subject to linear equality and inequality constraints. |

| Semester | Course Code | Course Name | Year of Introduction | Course outcome |
|---|---|---|---|---|
| VI | BSCHMTMC601 | Complex Analysis | 2018 | In this module, different properties of metric space like completeness, compactness, totally boundedness are taught. Banach Fixed point theorem and its applications are also taught. In the complex analysis, analytic functions, Cauchy integral theorem, Cauchy-Goursat theorem, Lioville's theorem, contour integrals are taught here. |
| | BSCHMTMC602 BSCPMTMDSE601 | Numerical Methods & Numerical Lab | 2018 | In this topic, we teach interpolation , numerical differentiation, numerical integration, solution of transcendental and polynomial equations, solution of system of linear algebraic equations and solutions of ordinary differential equations . |
| | BSCHMTMDSE601 | Discrete Mathematics | 2018 | In this skill enhancement course, we acquaint our students about some basic logic, propositional calculus, sets, subsets and different types of set operations. |
| | BSCHMTMDSE602 | Number Theory | 2018 | We taught about some important results in the theory of numbers including the prime number theorem, Chinese remainder theorem, Euler's theorem, Wilson's theorem and their consequences. |

# Durgapur Government College
## Mapping/Co-relation Program Outcome(PO) & Course Outcome(CO)

Department : Mathematics  Academic Session : 2024-25

| CO details | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | PO details | | | | | |
| Sl. No. | Course Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| 1. | BSCMTMMJ101 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2. | BSCMTMSE101 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3. | MDC113 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4. | BSCMTMMJ201 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 5. | BSCMTMSE201 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6. | MDC201 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7. | BSCMTMMN101 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8. | BSCHMTMC301 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 9. | BSCHMTMC302 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 10. | BSCHMTMC303 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 11. | BSCHMTMSE301 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 12. | BSCHMTMSE302 | | ✓ | ✓ | ✓ | ✓ | ✓ |
| 13. | BSCHMTMC401 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 14. | BSCHMTMC402 | ✓ | ✓ | ✓ | | ✓ | ✓ |
| 15. | BSCHMTMC403 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 16. | BSCHMTMSE401 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 17. | BSCHMTMSE402 | ✓ | ✓ | ✓ | | ✓ | ✓ |
| 18. | BSCHMTMC501 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| 19. | BSCHMTMC502 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|-----|-------------|---|---|---|---|---|---|
| 20. | BSCHMTMDSE501 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 21. | BSCHMTMDSE503 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 22. | BSCHMTMC601 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 23. | BSCHMTMC602<br>BSCPMTMDSE601 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 24. | BSCHMTMDSE601 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 25. | BSCHMTMDSE602 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |