

MATHEMATICS DEPARTMENT

Course outcomes

The mission of the **B.Sc Mathematics General (MTMG)** program is to give students the mathematical skills and literacy required by their chosen field of studying.

Course Outcomes, **Program:** BSc in Mathematics, **Program code:** MTMG

| SI No. | Course | Semester | Course Code | Credit | Marks | Course outcome | Skill Development related to employability |
|--------|---|----------|-------------|--------|-------|--|---|
| 1 | Algebra-I, Differential Calculus-I, Differential equation-I, Coordinate Geometry | 1 | CC1/GE1 | 6 | 100 | <ol style="list-style-type: none"> 1. Determine the rank of a matrix and find solution of a system of equations. 2. Find out the root of a polynomial equation. 3. Make idea about the positions of the roots of a polynomial equation. 4. Handle complex number arithmetic. 5. Calculate the limit of various functions. 6. Make difference between continuity and discontinuity of several functions. 7. Find out derivatives of functions and apply it to find approximation. 8. Find out the partial derivatives of function of several variables. 9. Solve a variety of ordinary differential equations analytically using different methods. 10. Derive equation of tangent, chord of contact, pole, polar of different conics. 11. Make classification of conics | Will enhance knowledge in theoretical Mathematics, that can be applied to different other fields and will help to crack examinations for government jobs. |
| 2 | Differential Calculus-II, Differential Equation-II, Vector algebra, Discrete Mathematics | 2 | CC2/GE2 | 6 | 100 | <ol style="list-style-type: none"> 1. Solve higher order differential equations. 2. Solve simple partial differential equations. 3. Apply vector addition, vector products to the problems of geometry, dynamics, and find various vector equations of the plane and straight line. 4. Distinguish between the concept of sequence and series and determine limits of sequence and their convergence and approximate sum of series. 5. Utilize approximate theory and computational techniques to construct Taylor series with its interval of convergence for use in variety of applications. 6. Finding maxima and minima for functions of several variables. 7. Solve linear Diophantine equation. 8. Use congruence to find out solution of congruence equation, check digit of ISBN, UPC, major credit cards, and Round Robin tournament. 9. Compute Boolean functions arithmetic. 10. Minimize a circuit, form different logic gates | Knowledge will help in competitive examinations like GATE, JECA etc. Also the course will be helpful in jobs like banking, finance, insurance. |

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| 3 | Integral Calculus, Numerical methods, Linear Programming | 3 | CC3/GE3 | 6 | 100 | <ol style="list-style-type: none"> 1. Evaluate different definite and indefinite integrals by selecting and correctly applying appropriate integration techniques. 2. Solve problems using Beta and Gamma functions. 3. Evaluate the double integral. 4. Use multiple integral to compute area, rectification, volume and surface areas of solids formed by revolution of plane curve. 5. Integrate and solve equation, find out root of an equation using different numerical techniques. 6. Use different interpolation methods for different types of equal and unequal arguments. 7. Form linear programming problems. 8. Solve various L.P.P using graphical method, simplex method etc. with various constraint conditions. 9. Solve transportation problem and assignment problem. | Develop the skill of computing. Idea on L.P.P will help to work in financial sectors. |
| 4 | Algebra-II, Computer Science and programming, Probability and Statistics | 4 | CC4/GE4 | 6 | 100 | <ol style="list-style-type: none"> 1. Find eigenvalues and eigenvectors of a matrix. 2. Make idea on groups, rings, fields, and vector space. 3. Make basic idea on computer science – history, simple arithmetic, different programming languages. 4. Write algorithm and flow chart and simple programming on FORTRAN. 5. Solve basic problems of probability and statistics. | This course will help to get job in the sector of data analysis. |
| 5 | C-Programing Language | 3 | SEC-A | 2 | 100 | write programs in C and will be familiar with different library functions, history of computers, different languages etc | Skill of writing codes will help to work in software companies. |
| 6 | Mathematical Logic | 4 | SEC-B | 2 | 100 | make idea on propositions, implications, propositional logic, predicate logic etc | Increase logical thinking that will be helpful to work as policy maker. |
| 7 | Object Oriented Programming in C++ | 5 | SEC-A | 2 | 100 | Students will be able to write programs in C++. | Skill of writing codes will help to get job in IT. |
| 8 | Boolean Algebra | 6 | SEC-B | 2 | 100 | Use Boolean algebra in construction of Boolean polynomial. Also different methods will be used in switching circuit theory and minimization of circuit theory. | Help to develop the idea of constructing logical circuits and thus getting jobs related to software development |

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| 9 | Particle Dynamics | 5/6 | DSE-A | 6 | 100 | <ol style="list-style-type: none"> 1. Make idea on velocity, acceleration in different coordinate systems. 2. Use the concept of force to determine work, power, energy, momentum of various dynamical systems. 3. Apply the theory of central orbit to study planetary motions. 4. Use the concept of resistance in practical problems | Develop knowledge in basic dynamical theory that can be useful in engineering sectors |
| 10 | Graph Theory | 5/6 | DSE-A | 6 | 100 | <ol style="list-style-type: none"> 1. Make idea on different types of graphs and their properties. 2. Apply the theory to solve practical problems. | Help to work in the field of networking. |
| 11 | Advanced Calculus | 5/6 | DSE-B | 6 | 100 | <ol style="list-style-type: none"> 1. Make idea on convergence of sequence and series of functions. 2. Determine radius of convergence of power series. 3. Expand function in Fourier series. 4. Use Laplace transform to find solution of ODE. | Increase the knowledge in theoretical mathematics and help studying and working in the field of telecommunication. |
| 12 | Mathematical Finance | 5/6 | DSE-B | 6 | 100 | Get basic idea interest, inflation, Bond, Asset return, Portfolio return, random returns etc. | This course is structured to work in financial and banking sectors. |

Programme outcomes(PO) B.Sc Mathematics

- **Subject Knowledge:** Students should formulate, analyze and solve complex and diverse problems through analytical and computational techniques and apply them to other disciplines when appropriate.
Courses in the program teach students to create, analyze, and interpret mathematical models and to communicate sound arguments based on mathematical reasoning.
- **Lifelong learning:** Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological challenge.
- **Application of Knowledge:** Graduates will extract mathematically relevant information from data, test hypotheses and assumptions, and formulate logical conclusions using mathematical analysis. They will independently extend mathematical ideas and arguments from previous coursework to a mathematical topic not previously studied.
- **Develop mathematical thinking:** Graduates will develop mathematical thinking, progressing from a procedural/computational understanding of mathematics to a broad understanding encompassing logical reasoning, generalization, abstraction, and formal proof.

- **Communicate mathematical ideas:** The graduates will be able to communicate mathematical ideas via extended, clear and well-organized written presentation.
- **Career:** The mathematics degree will prepare students for careers in the corporate sector, tech industry, and government agencies.

Programme Specific Outcomes(PSO) B.Sc Mathematics

PSO1: Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods.

PSO2: Develop mathematical thinking.

PSO3: Apply the underlying unifying structures of mathematics and the relationships among them.

PSO4: Extract mathematically relevant information from data, test hypotheses and assumptions, and formulate logical conclusions using mathematical analysis.

PSO5: Demonstrate basic manipulative skills in algebra, geometry, logic, calculus etc.

PSO6: Solve mathematical problems using technology.