B.Sc. Mathematics Syllabus

- **Duration:** 3 Years (6 Semesters)
- **Total Credits (typical):** 120–140 credits

Year 1 – Semester 1

- Calculus (Differential Calculus, Limits, Continuity, Differentiation, Applications)
- Algebra (Matrices, Determinants, Systems of Linear Equations, Eigenvalues)
- English / Communication Skills (AECC – Ability Enhancement Compulsory Course)
- Environmental Science (AECC)
- Computer Fundamentals / Basics of Programming (optional SEC)

Year 1 – Semester 2

- Calculus II (Integral Calculus, Multiple Integrals, Beta & Gamma Functions)
- Analytical Geometry (2D & 3D Coordinate Geometry, Conic Sections, Planes, Lines)
- English / MIL / Communication (AECC)
- Generic Elective 1 (e.g., Physics – Mechanics, Economics – Microeconomics, Statistics – Descriptive Statistics)
- Skill Enhancement Course (e.g., Mathematical Modeling Basics, LaTeX for Documentation)

Year 2 – Semester 3

- Real Analysis I (Real Numbers, Sequences, Series, Limits, Continuity)
- Abstract Algebra I (Groups, Subgroups, Cyclic Groups, Lagrange's Theorem)
- Differential Equations (Ordinary Differential Equations – First & Higher Order)
- Generic Elective 2 (e.g., Physics – Electricity & Magnetism, Computer Science – Programming in C/Python)
- Skill Enhancement Course (e.g., Numerical Methods using Python/MATLAB, Graph Theory Applications)

Year 2 – Semester 4

- Real Analysis II (Riemann Integration, Sequences & Series of Functions, Uniform Convergence)
- Abstract Algebra II (Rings, Integral Domains, Fields, Ideals)
- Linear Algebra (Vector Spaces, Linear Transformations, Inner Product Spaces)

- Generic Elective 3 (e.g., Statistics – Probability Distributions, Economics – Macroeconomics)
- Skill Enhancement Course (e.g., Operations Research – Linear Programming, Financial Mathematics)

Year 3 – Semester 5

Core Subjects

- Complex Analysis (Analytic Functions, Cauchy-Riemann Equations, Contour Integration)
- Numerical Analysis (Error Analysis, Interpolation, Numerical Differentiation & Integration, Root Finding)
- Mechanics / Mathematical Physics (or Discrete Mathematics)

Discipline Specific Electives (DSE) – Choose 2

- Probability & Statistics
- Vector Calculus & Tensor Analysis
- Mathematical Modeling & Simulation
- Number Theory
- Cryptography (Basics)

Year 3 – Semester 6

Core Subjects

- Partial Differential Equations (Formation, Solution by Separation of Variables, Applications)
- Topology (Metric Spaces, Topological Spaces, Continuity, Compactness – Introductory)

Discipline Specific Electives (DSE) – Choose 2

- Operations Research
- Fluid Dynamics
- Graph Theory & Combinatorics
- Fourier Analysis & Laplace Transforms
- Mathematical Finance / Actuarial Mathematics
- Advanced Linear Programming / Game Theory

Capstone / Project

- Project Work / Dissertation / Internship (Mathematical Modeling, Data Analysis, or Research Topic)

- Comprehensive Viva-Voce

Common Structure Notes (2025–2026)

- Core Courses (CC): Calculus, Algebra, Analysis, Differential Equations, Linear Algebra, Abstract Algebra, Complex Analysis
- Discipline Specific Electives (DSE): Usually 4 total in Sem 5 & 6
- Generic Electives (GE): From other streams (Physics, Statistics, Economics, Computer Science) – helps interdisciplinary exposure
- Skill Enhancement Courses (SEC): Practical / application-oriented (Python, MATLAB, LaTeX, Numerical Methods, etc.)
- Ability Enhancement Compulsory Courses (AECC): English + Environmental Studies
- Value Added Courses (VAC – NEP): Yoga, Ethics, Cyber Security, Constitution of India, etc. (1–2 credits each)