MATHEMATICS

Course Outcome

📖 Semester I

Course: Algebra (MJC-O1 / MIC-O1)
Course Outcomes:

1. Employ De Moivre's theorem in a number of applications to solve numerical problems.
2. Apply Euclid's algorithm and backwards substitution to find the greatest common divisor.
3. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix using rank.

📖 Semester II

Course: Calculus & Geometry (MJC-02 / MIC-02)
Course Outcomes:

1. Apply derivatives in Optimization, Social sciences, Physics and Life sciences.
2. Compute the area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.

📖 Semester III

Course: Real Analysis (MJC-03 / MIC-03)
Course Outcomes:

1. Understand properties of the real line and define sequences via functions.
2. Recognize bounded, convergent, divergent, Cauchy, and monotonic sequences.
3. Apply convergence tests for infinite series of real numbers.

📖 Semester IV

Course: Ordinary Differential Equations (MJC-04 / MIC-04)
Course Outcomes:

1. Understand the concept of ODEs.
2. Solve first-order and higher-order linear differential equations using various techniques.
3. Apply these techniques to mathematical models.

Course: Theory of Real Functions (MJC-05 / MIC-05)
Course Outcomes:

1. Understand the concept of limit of a function.
2. Understand properties of continuous functions on closed intervals.
3. Apply Mean Value Theorems and Taylor's Theorem.

📖 Semester V

Course: Group Theory (MJC-06 / MIC-06)
Course Outcomes:

1. Recognize groups and classify them (abelian, cyclic, etc.).
2. Understand cosets, normal subgroups, and factor groups.
3. Understand homomorphisms and isomorphisms.

Course: Partial Differential Equations (MJC-07 / MIC-07)
Course Outcomes:

1. Formulate, classify, and transform PDEs into canonical form.
2. Solve linear and non-linear PDEs.
3. Apply Laplace transforms for solving PDEs.

📖 Semester VI

Course: Ring Theory and Linear Algebra-I (MJC-08 / MIC-08)
Course Outcomes:

1. Understand Rings, Fields, subrings, integral domains, and homomorphisms.
2. Understand linear independence, basis, and dimension of vector spaces.
3. Learn linear transformations, Rank-Nullity Theorem, and change of basis.

📖 Semester VII

Course: Multivariate Calculus (MJC-09 / MIC-09)
Course Outcomes:

1. Understand calculus with multivariable functions.
2. Explore line, double, and triple integrals.
3. Apply calculus to physics, optimization, and geometry.

Course: Complex Analysis (MJC-10 / MIC-10)
Course Outcomes:

1. Understand Cauchy-Riemann equations and differentiability.
2. Evaluate contour integrals using Cauchy theorems.
3. Expand functions via Taylor and Laurent series and understand Möbius transformations.

📖 Semester VIII

Course: Metric Space (MJC-11)
Course Outcomes:

1. Understand metric space concepts like open/closed balls and sets.
2. Explore continuity, compactness, and connectedness in abstract settings.
3. Apply fixed point theorems and understand completeness.

Course: Riemann Integration and Series of Functions (MJC-12)
Course Outcomes:

1. Understand Riemann integrability and applications.
2. Apply Beta and Gamma functions.
3. Analyze series of functions, including power series and uniform convergence.

Course: Ring Theory and Linear Algebra-II (MJC-13)
Course Outcomes:

1. Understand factorization in rings and integral domains.
2. Compute eigenvalues, eigenvectors, and diagonalize operators.
3. Apply inner products, Gram-Schmidt process, and study orthogonal operators.

Course: Numerical Methods (MJC-15)
Course Outcomes:

1. Apply numerical techniques for roots and systems of equations.
2. Use interpolation, differentiation, and integration methods.
3. Solve differential equations numerically.

Course: Mathematical Finance (MJC-16)
Course Outcomes:

1. Understand interest rate types and financial instruments.
2. Learn derivative pricing, hedging, and arbitrage.
3. Apply binomial and risk-neutral models for pricing.