

4 Year Bachelor of Science/ Arts (MATHEMATICS) CBCS

List of Major Core Courses (MJC):

Sl. No.	Sem	Course Code	Name of the Course	Credits	Marks
1.	I	MJC-01	Algebra	6	100
2.	II	MJC-02	Calculus & Geometry	6	100
3.	III	MJC-03	Real Analysis	5	100
4.	III	MJC-04	Ordinary Differential Equations	4	100
5.	IV	MJC-05	Theory of Real Functions	5	100
6.	IV	MJC-06	Group Theory	5	100
7.	IV	MJC-07	Partial Differential Equations	5	100
8.	V	MJC-08	Ring Theory and Linear Algebra-I	5	100
9.	V	MJC-09	Multivariate Calculus	5	100
10.	VI	MJC-10	Complex Analysis	4	100
11.	VI	MJC-11	Metric Space	5	100
12.	VI	MJC-12	Riemann Integration and Series of Functions	5	100
13.	VII	MJC-13	Ring Theory and Linear Algebra-II	5	100
14.	VII	MJC-14	Research Methodology	5	100
15.	VII	MJC-15	Numerical Methods	6	100
16.	VIII	MJC-16	Mathematical Finance	4	100
Sub Total = 80					

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14/06/23

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List of Minor Core Courses (MIC):

Sl. No.	Sem.	Course Code	Name of the Course	Credits	Marks
1.	I	MIC-01	Algebra	3	100
2.	II	MIC-02	Calculus & Geometry	3	100
3.	III	MIC-03	Real Analysis	3	100
4.	IV	MIC-04	Ordinary Differential Equations	3	100
5.	V	MIC-05	Theory of Real Functions	3	100
6.	V	MIC-06	Group Theory	3	100
7.	VI	MIC-07	Partial Differential Equations	3	100
8.	VI	MIC-08	Ring Theory and Linear Algebra-I	3	100
9.	VII	MIC-09	Multivariate Calculus	4	100
10.	VIII	MIC-10	Complex Analysis	4	100
Sub Total = 32					

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MIC-01: Algebra (03 credits) (Lecture: 30)

Course Objectives: The primary objective of this course is to introduce the basic tools of theory of equations, complex numbers, number theory and matrices to understand their linkage to the real-world problems.

Course Learning Outcomes: This course will enable the students to:

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

Course Contents:

Unit 1

(Lecture: 08)

Polar representation of complex numbers, De Moivre's theorem and its applications, Logarithms of complex quantities, Hyperbolic functions, Gregory series, Summation of series,.

Unit 2

(Lecture: 07)

Cartesian product of sets, Equivalence relations, Functions, Composition of functions, Invertible functions, Partial and Total order relation, Countable and Uncountable sets,

Unit 3

(Lecture: 08)

Matrices, Operation on Matrices, Kinds of matrices, Transpose, symmetric & skew symmetric matrices, Hermitian and skew Hermitian matrices, Adjoint and Inverse of a matrix, Solution of a system of linear equations by matrix methods.

Unit 4

(Lecture: 07)

Fundamental theorem of algebra, Relation between roots and coefficients of a polynomial equation, Evaluation of symmetric functions of roots, Transformation of equation, Solution of Cubic equation (Cardan's method).

References:

1. Dickson, Leonard Eugene (1922). *First Course in The Theory of Equations*. John Wiley & Sons, Inc. New York.
2. Lay, David C., Lay, Steven R., & McDonald, Judi J. (2016). *Linear Algebra and its Applications* (5th ed.). Pearson Education

Additional Readings:

1. Andrilli, Stephen, & Hecker, David (2016). *Elementary Linear Algebra* (5th ed.). Academic Press, Elsevier India Private Limited.

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2. Burton, David M. (2007). *Elementary Number Theory* (7thed.). Tata Mc-Graw Hill Edition, Indian Reprint.
3. K.K.Jha , Advanced Set Theory, Nav Bharat Publication, Patna
4. M.L.Khanna, Theory of Equations, Jai Prakash Nath & Co. Merrut (U.P.)
5. Lalji Prasad, Matrices, Paramount Publications Patna
6. Dasgupta , Trigonometry, Bharti Bhawan Patna

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