

**KADI SARVA
VISHWAVIDYALAYA,
GANDHINAGAR**



**B.Sc. Curriculum as Per NEP
Mathematics Courses for Semester 1**

W.E.F. June 2023



KADI SARVA VISHWAVIDYALAYA

Mathematics Major Course -1

MTM207-1C Elementary Calculus and Matrices

LEARNING OUTCOMES:

After completing this course student will be able to

- Understand the properties of matrices, row and column dependence, rank and inverse of a matrix, various types of matrices and row reduced echelon form.
- Find Eigen values and Eigen vectors of a given matrix.
- Solve system of linear equations (homogeneous and non-homogeneous)
- Find the n^{th} derivative of a function as well as the n^{th} derivative of the product of two functions.
- Find partial derivatives and check given function is homogeneous or not.
- Understand concept of Jacobian, point of inflection and maxima and minima.

TEACHING AND EVALUATION SCHEME:

Subject Code	Subject Title	Teaching Scheme	Credits	Examination Scheme			Total Marks
		Theory Per Week		Hrs.	Max Marks		
					CCE	SEE	
MTM207-1C	Elementary Calculus and Matrices	4	4	2.5	50	50	100

Unit 1 Matrices

Teaching Hours: 15

Introduction of matrices, Different types of matrices, Operations on matrices, Symmetric and skew -symmetric matrices, Hermitian and skew-Hermitian matrices, Linear dependence and independence of row and column matrices, Row rank, Column rank and rank of matrix, Row reduced Echelon form of a matrix and matrix inversion using it.

Unit 2 Eigen values and Eigen vectors

Teaching Hours: 15

System of homogeneous linear equations, System of non-homogeneous linear equations, Eigen values and Eigen vectors, Nature of Eigen values of special types of matrices, Algebraic and Geometric multiplicity of Eigen values, Cayley Hamilton theorem.

Unit 3 Successive Differentiation

Teaching Hours: 15

Revision of Differentiation, Successive derivatives, Some standard results for n^{th} derivatives, Leibnitz's theorem and its examples, Cauchy's Mean Value Theorem, Taylor's Theorem, McLaurin's series and its examples, Expansion of power series of $\sin x$, $\cos x$, e^x .



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Unit 4 Partial Differentiation

Teaching Hours: 15

Limit, Continuity, Types of discontinuity, Partial derivatives, Partial derivatives of higher order, Homogenous function, Euler's theorem on homogenous function, Jacobian, Point of Inflection, Maxima and Minima.

- *Continuous Evaluation: It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests

Reference Books:

1. Differential Calculus, Shanti Narayan, S. Chand Publishing.
2. Linear Algebra and Vector Calculus, Ravish R. Singh, Mukul Bhatt, McGraw Hill Education (India) Private Limited.
3. Calculus, Dr. R.C. Shah, Books India Publication.
4. Mathematical Analysis, S C Malik and Savita Arrora, New Age International (P) Limited.
5. A Textbook of Matrices, Shanti Narayan, S Chand.



KADI SARVA VISHWAVIDYALAYA

Mathematics Major Course -2

MTM208-1C Application of Calculus and Matrices

Learning Outcomes:

After completing this course student will be able to

- Identify Hermitian and Skew-Hermitian matrices.
- Understand the concept of linear dependence and independence.
- Find rank of matrices.
- Convert a given matrix in to row echelon form.
- Solve system of homogeneous and non-homogeneous linear equations.
- Find Eigen values and Eigen vectors of a given matrix.
- Verify Caley Hamilton theorem.
- Develop concept of successive differentiation.
- Apply Leibnitz theorem.
- Understand the concept of partial derivatives.
- Find maxima and minima and point of inflection
- Understand different coordinate system and their transformation.

TEACHING AND EVALUATION SCHEME:

Subject Code	Subject Title	Teaching Scheme	Credits	Examination Scheme			Total Marks
		Practical Per Week		Hrs.	Max Marks		
					CCE	SEE	
MTM208-1C	Application of Calculus and Matrices	8	4	5	50	50	100

Unit-1: Application of Matrices

Teaching Hours: 60

1. Explore properties of a Hermitian and Skew-Hermitian Matrices and provide examples illustrating the concepts.
2. Explore the Linear dependence and independence of row and column of matrices and provide examples illustrating the concepts.
3. Find rank of a Matrix by means of examples.
4. By means of Row Reduction Echelon Form find the rank and inverse of matrices and other related examples.
5. Find solution of System of Homogeneous Linear Equations.
6. Find solution of System of Non-Homogeneous Linear Equations
7. To find Eigen values and Eigen vectors of a given matrix and nature of Eigen values
8. Verify Caley Hamilton theorem and find inverse of matrices through this.



Unit-2 Application of Calculus

Teaching Hours: 60

1. Finding the n^{th} derivative of various functions. Solve examples to illustrate the application of successive differentiation in finding higher-order derivatives.
2. Apply Leibnitz's theorem for successive differentiation.
3. Apply Leibnitz's theorem for successive differentiation for parametric equations.
4. Examples based on partial derivatives at given point.
5. Examples based on partial derivatives for higher order.
6. To find maxima and minima of given function.
7. To find point of inflection of given function.
8. Cartesian, Polar, Spherical and Cylindrical coordinate system and their transformation

Reference Books:

6. Differential Calculus, Shanti Narayan, S. Chand Publishing.
7. Linear Algebra and Vector Calculus, Ravish R. Singh, Mukul Bhatt, McGraw Hill Education (India) Private Limited.
8. Calculus, Dr. R.C. Shah, Books India Publication.
9. Mathematical Analysis, S C Malik and Savita Arora, New Age International (P) Limited.
10. A Textbook of Matrices, Shanti Narayan, S Chand.



KADI SARVA VISHWAVIDYALAYA

Mathematics Minor Course – Semester 1

MTE205-1C Descriptive Statistics

Learning Outcomes:

After completing this course student will be able to

- Analyze data using statistical measures of central tendency such as mean, median and mode.
- Analyze data using different partition values and to understand the concept of geometric and harmonic mean.
- Understand the relation between partition values and come to know about its merits and demerits.

TEACHING AND EVALUATION SCHEME:

Subject Code	Subject Title	Teaching Scheme		Credits	Examination Scheme			Total Marks
		Theory Per Week	Practical Per week		Hrs.	Max Marks		
						CCE	SEE	
MTE205-1C	Descriptive Statistics	2	4	4	2.5	50	50	100

Unit 1 Measures of Central Tendency-I

Teaching Hours: 15

Concept of central tendency, various measures of central tendency (mean, median and mode) and their inter relationship, comparison and their merits and demerits.

Unit 2 Measures of Central Tendency-II

Teaching Hours: 15

Geometric mean and its computation, harmonic mean and its computation, partition values – quartiles, octiles, deciles and percentiles, relation between partition values, their merits and demerits.

Practical's

Teaching Hours: 60

1. Computation of Arithmetic mean in Discrete series
2. Computation of Arithmetic mean in Continuous series
3. Computation of Weighted Arithmetic mean
4. Computation of median in case of Discrete series
5. Computation of median in case of Continuous series
6. Computation of mode in case of Discrete series
7. Computation of mode in case of Continuous series
8. Computation of geometric mean, combined geometric mean and weighted geometric mean
9. Computation of Harmonic mean
10. Computation of partition values – quartiles, octiles, deciles and percentiles



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- *Continuous Evaluation: It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests

Reference Books:

1. Statistical analysis: Graphs and diagrams, Spectrum books (P) Ltd, New Delhi.
2. Introduction to the Practice of Statistics, Moore, S. David; McCabe, P. George W. H. Freeman and Company, New York.
3. Basic Statistics, Agarwal, B. L., New Age International (P) Ltd.
4. Introduction to the theory of Statistics, Mood, A. M., Greybill, F.A., Boes, D.C., McGraw Hill.
5. Fundamentals of Mathematical Statistics, S. C. Gupta and V. K. Kapoor, Sultan Chand and Sons, New Delhi.



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Mathematics Multidisciplinary Course – Semester 1

MDC215-1C Introduction to ‘C’

Learning Outcomes:

After completing this course student will be able to

- Develop program in C
- Able to know importance of an array by real life example as well as technical problem solving.
- Able to develop functions and enrich their skill to library function and user define side.
- Able to know the importance pointer

TEACHING AND EVALUATION SCHEME:

Subject Code	Subject Title	Teaching Scheme		Credits	Examination Scheme			Total Marks
		Theory Per Week	Practical Per week		Hrs.	Max Marks		
						CCE	SEE	
MDC215-1C	Introduction to ‘C’	2	4	4	2.5	50	50	100

Unit 1 Basics of C language

Teaching Hours: 15

C character set, Identifiers and keywords, Data types, Enumeration type, constants, variables, declarations, qualifiers – long, short and unsigned declarations, expressions, symbolic constants, input/output functions, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, increment and decrement operators, Precedence and order of evaluation, conditional operators, bit operators, type casting, using library functions in math.h

Control flow: If statement, if...else statement, nested if..else statement, switch statements, looping – for loop , while loop, do ... while statements, nested loop structure, break, continue and go to statements.

Unit 2 Arrays, Strings and Pointers

Teaching Hours: 15

Array and Strings: Single dimensional arrays, multidimensional arrays, initializing array using static declaration, Searching and sorting of Arrays, Array of Characters, Character arrays and strings, String handling Functions.

Pointers: Introduction to pointers, Benefits of using pointers, Concept of pointer, Declaring pointer variable, Initialization of pointer variable.

Practical's

Teaching Hours: 60

1. Programs using Basic Constructs.
2. Programs using Control Structure.



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3. Programs using Arrays
4. String Manipulation Programs.
5. User Defined Function Programs.
6. Programs using Structure.
7. Programs using Pointer.

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Reference Books:

1. Programming in ANSI C 4E , E. Bala Guruswamy, TMH
2. Programming in C, Byron S Gottfried, Shaum's Outline series. TMH
3. Computer Fundamentals By P K Sinha & Priti Sinha Fourth Edition.
4. B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PH



KADI SARVA VISHWAVIDYALAYA

Mathematics SEC (Skill Enhancement Course) – Semester 1

SEC214-1C Vedic Mathematics

Learning Outcomes:

After completing this course student will be able to

- Find complement of numbers.
- Do complex multiplication without calculator.
- Perform multiplication of algebraic expression of various powers.
- Do complex division without help of calculator.
- Find squares and cubes of numbers mentally.
- Find square roots of perfect squares and cube roots of perfect cubes mentally.

Subject Code	Subject Title	Teaching Scheme		Credits	Examination Scheme			Total Marks
		Theory Per Week	Practical Per week		Hrs.	Max Marks		
						CCE	SEE	
SEC214-1C	Vedic Mathematics	2	0	2	2	25	25	50

Unit 1	Teaching Hours: 15
History of Indian mathematics, Complement, Multiplication by specific numbers, Base Multiplication, Working base multiplication, Multiplication.	
Unit 2	Teaching Hours: 15
Algebra, Division, Squares, Cubes, Square root of exact squares, Cube roots of exact cube.	

Reference Books:

1. Vedic Mathematics for all ages, Vandana Singhal, Shri Jinendra Press.
2. Vedic Mathematics, Jagadguru Swami Sri Bharati Krsna Tirthaji Maharaja, Motilal Banarsidass.
3. Vedic Mathematics for schools book 1, J. T. Glover, Motilal Banarsidass.