Sem IV

KSKV Kachchh University: BHUJ

B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: LINEAR ALGEBRA-II
PAPER Code: MAJ MAT-401/MIN MAT - 407
(3 Credits)

Unit 1

Eigen value and eigen vectors of a Matrix, Theorems and examples,Algebraic and geometrical multiplicity of an eigen values.

Unit 2

Cayley- Hamilton Theorem and application, Diagonalization of a Matrix by Similarity transformation, Power of matrix, Orthogonally diagonalizable matrix.

Unit 3

Quadratic Form, linear transformation of quadratic form, Canonical Form using linear and orthogonal transformation, Index , signature and definiteness of a quadratic form.

❖ **Reference Books :**

1. An introduction to Linear Algebra: V. Krishnamurthy

2. SurekhBijganit (in gujarati) : Dr. L. K. Patel

3. Linear Algebra: G Paria.

4. Linear Algebra :A.R.Vasistha

KSKV Kachchh University: BHUJ
B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: LINEAR ALGEBRA – II - Practical
PAPER Code: MAJ MAT-402 -P/ MIN MAT-408-P
(1 Credit)

Practical No.	Description
1	Write basic code of an array in C programming.
2	Write code to insert and delete an element from an array in C programming.
3	Write code to reverse an array in C programming.
4	Write code to find the largest and smallest number in an array in C programming.
5	Write code to find sum of n numbers using an array in C programming.
6	Write code to sort element of an array in C programming.
7	Write code to remove duplicate element of an array in C programming.
8	Write code to reverse an array in C programming.

Note: The preferable and recommended software for above practical is **Microsoft Visual Studio** because it offers wide applications.

❖ **Reference books:**

1. Let Us C: Authentic Guide to C programming Language: Yashavant Kanetkar

2. Computing Fundamentals and C programming: E. Balgurusamy

3. C Programming for Beginners: Dr, Madhav Bokare and Ms. Nishigandha Kurale

Note: This list is demonstrative and institute can apply necessary changes in content and design of practical as per the availability of infrastructure and need of the students and requirement of skills in the region.

Preferable Infrastructure Requirement: A well-equipped computer lab with **Microsoft Visual Studio** or equivalent.

Human resource requirement: A lab in-charge with good computer knowledge preferably PGDCA, BCA required for computer lab.

KSKV Kachchh University: BHUJ
B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: LINEAR ALGEBRA -III
PAPER Code: MAJ MAT-403
(3 Credits)

Unit 1

Matrix associated with a linear map, Linear map associated with a matrix, The set $M_{m,n}$, Linear operations on $M_{m,n}$, Isomorphism between $M_{m,n}$ and L (U , V), Dimension of $M_{m,n}$ and L (U , V), Linear functional, Dual space, Dual basis, Dual basis Existence Theorem,

Unit 2

Inner product spaces, properties of inner product space, Cauchy – Schwartz inequality, Triangle inequality, Pythagorean theorem, angle between the vectors, Orthogonality, Orthogonal set.

Unit 3

Orthonormal set, Orthonormal basis, Gram – Schmidt orthogonalization process, orthogonal complement of a subspace, orthogonal transformation.

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3. Linear Algebra: G Paria.

4. Linear Algebra :A.R.Vasistha

KSKV Kachchh University: BHUJ
B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: LINEAR ALGEBRA – III - Practical
PAPER Code: MAJ MAT-404 - P
(1 Credit)

Practical No.	Description
1	Basics programming of Matrix in C programming.
2	Write a program of addition of two given matrices in C programming.
3	Write a programme to find the maximum and minimum element and their index in a matrix in C programming.
4	Write a programme to Print the transpose of a given matrix in C programming.
5	Write a programme to rotate a given matrix 90 degrees clockwise in C programming.
6	Write a programme for the multiplication of two matrices in C programming.
7	Write a programme to draw a matrix by Wave printing in C programming.
8	Write a programme to draw a matrix by SPIRAL printing in C programming.

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3. C Programming for Beginners: Dr, Madhav Bokare and Ms. Nishigandha Kurale

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KSKV Kachchh University: BHUJ
B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: ADVANCED CALCULUS – III
PAPER Code: MAJ MAT-405
(3 Credits)

Unit 1   **[15marks]**

Expansion of real functions of one and two variables using Taylor's formula, Expansion of real functions of one and two variables using Maclaurin's formula.

Unit 2   **[15 marks]**

Double Points for the real functions of two variables, Types of Double points

Unit 3   **[15 marks]**

Vector Calculus : Gradient of a scalar function, Divergence of a vector function, Curl of a vector function.

❖ **Reference Books :**

1. Advanced Calculus: David Widder (Prentice-Hall, inc)
2. Differential Calculus: Shanti Narayan (S. Chand & Co)
3. Integral Calculus: Shanti Narayan (S. Chand & Co)
4. Advanced Calculus Vol. 2 : Tom Apostol (published by John Wiley & Sons)

KSKV Kachchh University: BHUJ
B.Sc.: Semester: IV (FOUR) SUBJECT: MATHEMATICS
PAPER: Advanced Calculus – III - Practical
PAPER Code: MAJ MAT-406 - P
(1 Credit)

Practical No.	Description
1	Basics programming for the mathematical functions in C programming.
2	Write a programme for calculating nPr and nCr for a given data in C programming.
3	Write a programme to find first n Fibonacci numbers in C programming.
4	Write a programme to print Pascal Triangle in C programming.
5	Write a programme to find the Power of n in C programming.
6	Write a programme to find LCM of two numbers in C programming.
7	Write a programme to find GDC of two numbers in C programming.
8	Write a programme to find the prime factors of a given number in C programming.

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