

Krantiguru Shyamji Krishna Verma

***Kachchh University***

Mundra Road

**BHUJ : 370 001**



SYLLABUS ( CBCS )

**B. Sc. Semester III**

**MATHEMATICS**

CODE: CEMT-303

With effect from June 2017

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Syllabus of Mathematics for CBCS Semester III**

**Name of the Paper: Advanced Calculus I**

**Paper No. : CEMT-303**

**Unit 1**

**[15 marks]**

Limits of real functions of two variables (only examples using definition), Iterated limits, Continuity of functions of two variables (only examples)

**Unit 2**

**[15 marks]**

Partial Derivatives of first order (only examples), Partial Derivatives of second order (only examples)

**Unit 3**

**[15 marks]**

Directional Derivatives, Differentiation (Definition and relation between differentiability and continuity of the function), Young's theorem, Schwarz theorem

**Unit 4**

**[15 marks]**

Homogeneous functions, Euler's theorem, Examples of Euler's theorem

**❖ 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)

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SYLLABUS ( CBCS )

**B. Sc. Semester III**

**MATHEMATICS**

CODE: CEMT-304

With effect from June 2017

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Syllabus of Mathematics for CBCS Semester III**

**Name of the Paper :Linear Algebra I**

**Paper No. : CEMT-304**

**Unit 1**

**[15 marks]**

Vector spaces, properties of vector space, subspace of a vector space, Linear combination of vectors, span of a set, Linear dependence and linear independence of vectors

**Unit 2**

**[15 marks]**

Basis of a vector space, Finite – dimensional vector space, Dimension of a vector space, coordinates of a vector, Dimension Theorem

**Unit 3**

**[15 marks]**

Linear Transformation, Matrix associated with a linear map, Linear map associated with a matrix, The set  $M_{m,n}$ , Range, rank, kernel and nullity of a linear Transformation, Range space and null space, Rank – Nullity theorem.

**Unit 4**

**[15 marks]**

singular and non-singular linear Transformation, Invertible linear transformation, The space  $L(U,V)$ , composition of linear Transformations, Isomorphism between  $M_{m,n}$  and  $L(U,V)$ , Dimension of  $M_{m,n}$  and  $L(U,V)$ .

**❖ Reference Books :**

1. An introduction to Linear Algebra: V. Krishnamurthy
2. Linear Algebra: G Paria.
3. Linear Algebra: A.R.Vasistha

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SYLLABUS ( CBCS )

**B. Sc. Semester IV**

**MATHEMATICS**

CODE: CEMT-405

With effect from June 2017

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Syllabus of Mathematics for CBCS Semester IV**

**Name of the Paper: Advanced Calculus II**

**Paper No. : CEMT-405**

**Unit 1**

**[15 marks]**

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]**

Extreme values of real functions of two variables, Lagrange's Method for Extreme values of real functions of two variables

**Unit 3**

**[15 marks]**

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

**Unit 4**

**[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)

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SYLLABUS ( CBCS )

**B. Sc. Semester IV**

**MATHEMATICS**

CODE : CEMT-406

With effect from June 2017

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Syllabus of Mathematics for CBCS Semester IV**

**Name of the Paper: Linear Algebra II**

**Paper No. : CEMT-406**

**Unit 1** **[15 marks]**

Eigen value and eigen vectors of a Matrix, Theorems and examples, Cayley- Hamilton theorem, Diagonalization of a Matrix, Quadratic Form, Canonical Form.

**Unit 2** **[15 marks]**

Linear functional, Dual space, Dual basis, Dual basis Existence Theorem.

**Unit 3** **[15 marks]**

Inner product spaces, properties of inner product space, Cauchy – Schwartz inequality, Triangle inequality

**Unit 4** **[15 marks]**

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

❖ **Reference Books :**

1. An introduction to Linear Algebra: V. Krishnamurthy
2. Linear Algebra: G Paria.
3. Linear Algebra : A.R.Vasistha