

Krantiguru Shyamji Krishna Verma

Kachchh University

Mundra Road

BHUJ : 370 001



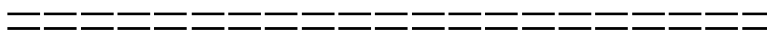
SYLLABUS (CBCS)

B. Sc. Semester III

MATHEMATICS

Code : MATHS -303

With effect from June 2012



KSKV Kachchh University, Bhuj - Kachchh

Syllabus of Mathematics for CBCS Semester III (wef June 2012)

Name of the Paper : Advanced Calculus I

Paper No. : Maths - 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)

The Structure of the External Examination Question Paper

Total Marks : 60

Total No. of Questions : 04

Question No.	Question type	Marks
1 Unit 1	Descriptive Questions (3 out of 4)	15
2 Unit 2	Descriptive Questions (3 out of 4)	15
3 Unit 3	Descriptive Questions (3 out of 4)	15
4 Unit 4	Descriptive Questions (3 out of 4)	15

- Each theory paper will have 4 lectures in a week and a practical will have 6 lectures per batch in a week.

INTERNAL EVALUATION SCHEME FOR MATHEMATICS:

A. Theory:

1. Internal Continuous and Comprehensive Evaluation (CCE) will be conducted by the department. The total weightage for CCE will be 40%.

2. End semester examination will have 60% weightage.

3. CCE Marking Scheme for Theory :

For each paper, 40 % of CCE may be further distributed as under :

- a) Seminar : 10 Marks
- b) Assignments : 10 Marks
- c) Unit Tests : 20 Marks

However, The Department Head will be final authority for finalizing the distribution for every semester.

4. CCE Marking Scheme for Practicals :

- a) Lab Performance/Internal practical Test : 20 Marks
- b) Semester End Evaluation Test : 30 Marks

List of Practicals

Semester III (Paper : Maths : 303)

- a. A Matlab program to draw the graph of $\sin(x^2)$ in given interval
- b. A Matlab program to draw the graph of $\cos(x^2)$ in given interval
- c. To make a presentation on Limits of functions of two variables
- d. To make a presentation on iterated limits
- e. To make a presentation on continuity of a function
- f. To make a presentation on Partial Derivatives of first order
- g. To make a presentation on Partial Derivatives of higher order
- h. To make a presentation on Euler's theorem and examples
- i. To make a presentation on Directional Derivatives

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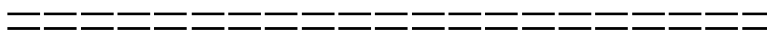
SYLLABUS (CBCS)

B. Sc. Semester III

MATHEMATICS

Code : MATHS -304

With effect from June 2012



KSKV Kachchh University, Bhuj - Kachchh

Syllabus of Mathematics for CBCS Semester III (wef June 2012)

Name of the Paper : Linear Algebra I

Paper No. : Maths - 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, Range, rank, kernel and nullity of a linear Transformation, Rank – Nullity theorem, singular and non-singular linear Transformation, The space $L (U , V)$, composition of linear Transformations, Operator equation.

Unit 4 [15 marks]

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 $L (U , V)$.

Reference Books :

1. An introduction to Linear Algebra : V. Krishnamurthy
2. Surekh Bijganit (in gujarati) : Dr. L. K. Patel
3. Surekh Bijganit (in gujarati) : Dr. I. H. Sheth
4. Linear Algebra : G Paria.

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List of Practicals

Semester III ; Paper No. Maths 304

- a. Practicals based on definition of vector space
- b. Practicals based on subspace of a vector space
- c. Practicals based on span of a vector set
- d. Practicals based on Linear dependence and Linear independence of vectors
- e. Practicals based on basis of a vector space
- f. Practicals based on coordinates of a vector
- g. Practicals based on verification of Dimension Theorem
- h. Practicals based on definition of linear transformation
- i. Practicals based on verification of Rank – Nullity Theorem
- j. Practicals based on singular and non-singular linear map
- k. Practicals based on operator equations
- l. Practicals based on matrix associated with linear map
- m. Practicals based on linear map associated with matrix

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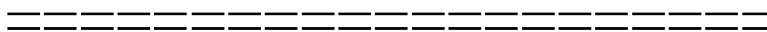
SYLLABUS (CBCS)

B. Sc. Semester IV

MATHEMATICS

Code : MATHS -405

With effect from June 2012



KSKV Kachchh University, Bhuj - Kachchh

Syllabus of Mathematics for CBCS Semester IV (wef June 2012)

Name of the Paper : Advanced Calculus II

Paper No. : Maths - 405

Unit 1 [15 marks]

Expansion of real functions of two variables using Taylor's formula, Expansion of real functions of 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)
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6. CCE Marking Scheme for Practicals :

- a) Lab Performance/Internal practical Test : 20 Marks
- b) Semester End Evaluation Test : 30 Marks

List of Practicals

Semester IV

- a. Mathematical expressions using 'Mathtype'
- b. To make a presentation on Taylor's expansion formula
- c. To make a presentation on Maclaurin's expansion formula
- d. To make a presentation on Extreme values of a function and examples
- e. To make a presentation on Lagrange's method for extreme values
- f. To make a presentation on double points of a curve
- g. To make a presentation on vector calculus

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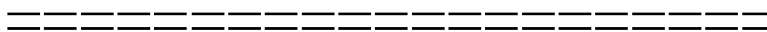
SYLLABUS (CBCS)

B. Sc. Semester IV

MATHEMATICS

Code : MATHS -406

With effect from June 2012



KSKV Kachchh University, Bhuj - Kachchh

Syllabus of Mathematics for CBCS Semester III (wef June 2012)

Name of the Paper : Linear Algebra II

Paper No. : Maths - 406

Unit 1 [15 marks]

Linear functional, Dual space, Dual basis, Dual basis Existence Theorem, Range, rank, kernel and nullity of a matrix

Unit 2 [15 marks]

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

Unit 3 [15 marks]

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

Unit 4 [15 marks]

Determinants, 2×2 determinant as an area of a parallelogram, Properties of determinants, computation of determinant, computation of determinant by using Laplace Expansion, $\det (AB) = (\det A)(\det B)$.

Reference Books :

1. An introduction to Linear Algebra : V. Krishnamurthy
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- b) Semester End Evaluation Test : 30 Marks

List of Practicals

Semester III : Paper No. Maths 406

- a. Practicals based on Dual space
- b. Practicals based on range, rank, kernel and nullity of a matrix
- c. Practicals based on definition of an inner product space
- d. Practicals based on verification of Cauchy – Schwartz inequality and Triangle inequality
- e. Practicals based on Gram – Schmidt orthogonalization process
- f. Practicals based on computation of determinant by using the properties of determinant
- g. Practicals based on computation of determinant by using Laplace - Expansion