MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

BACHELOR OF COMPUTER APPLICATION
(BCA Annual Scheme)
(To be offered in affiliated colleges from session 2016-17)

1. **Duration of the Course :** The BCA (AnnualScheme)course will be of three years duration. Each year will be approximately 10 months (minimum 180 working days) duration.

2. **Medium of Instruction :** The medium of instruction and examination shall be English.

3. **Eligibility :** The candidate must have passed 10+2examinations with at least 50% marks in aggregate (Pass marks for SC/ST candidates or as per Govt rules)

BCA 105: Basic Mathematics

Objectives: The aim of this course is to impart basic knowledge of Mathematics and its further application in various disciplines in computational sciences and technology. As Some of the students in BCA come from Arts , Commerce and Biology stream, Level of course is 12^{th} standard.

Unit-I

Sets & Relations : Sets and elements, Equal sets, Universal set & Empty set, Subsets, Venn diagrams, Basic operations on sets, Union & Intersection, Complements, Difference, Symmetric Difference, Fundamental Products, Algebra of sets and Duality, Finite Sets, Counting Principle, Classes of sets, Power sets, Partitions, Mathematical Induction, Cartesian Products of Sets, Relations, Pictorial representations of Relations, Composition of relations, Types of relations, Equivalence Relations, Partial ordering relations.

Unit-II

Functions, Limts and Continuity : Functions, Kinds of Functions , Concept of real function, Domain and Range (simple cases), Composition Function, One-to-one, onto, into, invertible functions, Mathematical Functions , Exponential and Logarithmic Functions, Graph of functions (plotting of linear function, absolute value function, parabolic functions, Sin(x), Cos(x), tan(x), reciprocal function, e^x, log x, Signum function), Polar coordinates and graph, Limit of variable, Limit of function, Evaluation of
limits of various types of functions, Continuity & Discontinuity at a point, Continuity over aninterval.

Trignometrical Functions: Definitions, proofs for any angle θ, signs of ratios, ratios of

some standard angles.

Unit-III

Quadratic Equation: Solution of Quadratic Equations, Nature of Roots.

Co-ordinates and Loci: Cartesian co-ordinate system, Introduction to Polar co- ordinates, distance between two points, section formulae, Area of triangle, Locus and its Equation.

Straight Line: Equation of straight line parallel to an Axis, slope form, intercept form, through two point condition of concurrency of three lines.

Matrices and Determinants : Definition and Types of Matrices, Addition , Subtraction and Multiplication of a Matrices, Scalar Multiplication, Transpose of Matrix, Determinants, Determinants of square matrix of order 1, 2 and 3, Area of a triangle, Solution of system of linear equations by Cramer's Rule, Minors and Cofactors , Adjoint of a Matrix, Inverse of a Matrix(up to order 3).

Unit-IV

Differential Calculus: Derivative of a Function, Various Formulae-Product and Quotient Rule of Differentiation, Differentiation of Function of Function(chain rule), Trignometrical functions, Inverse Trignometrical functions, Exponential function, Logarithmic function, Implicit functions, Logarithmic Differentiation, Diffentiation of function w.r.t. another function, Higher Derivatives, Successive Differentiation, Liebnitz Theorem, Expansion of functions(up to 3 or 4 terms only) using Maclaurin's and Taylor's Theorem, Maxima and Minima (simple cases), Curve tracing (simple cases), Introduction to partial differentiation.

Unit-V

Integral Calculus : Anti-Derivatives, Constant of integration, Indefinite integral, Elementary Integration Formulae, Methods of Integration, Integration by Substitution, Integration by parts, integration through partial fractions and rationalisation, Concept of Definite integral, properties of definite integral, Integration of ${}_0\int^{\pi/2} \mathrm{Sin}^n x \ \mathrm{Cos}^m x$ using Gamma function. Area of Bounded Region, Circle, Parabola, Ellipse in standard form between two ordinates and x- axis.

Books:

1. Descrete Mathematics . Schaum'sOutlines
2. Differential Calculas By Shanti Narayan,P.K.Mittal
3. Integral Calculas By Shanti Narayan,P.K.Mittal
4. Elementary Calculas By Gokhru &Bhargav.
5. Business Mathematics By Quaji Zameeruddin, V.K.Khanna,S.K.Bhambri
6. Comprehencive Mathematics Class XII Part-A By ParmanandGupta