

### (APPENDIX-V)

### SYLLABUS FOR MCA /MCA (LE) PROGRAMME & M.SC. COMPUTER SCIENCE

#### MATHEMATICS

**Unit 1:- Algebra of Sets :** Set operations, Union, Intersection, Difference, Symmetric Difference, Complement, Venn Diagram, Cartesian products of sets, Relation and Function, Composite Function, Inverse of a Function, Equivalence Relation, Kinds of Function.

**Unit 2:- Number Systems :** Real numbers (algebraic and other properties), rational and irrational numbers, Complex numbers, Algebra of complex numbers, Conjugate and square root of a complex number, cube roots of unity, De-moivre's Theorem with simple applications. Permutation and combinations and their simple applications, Mathematical induction, Binomial Theorem. Determinants up to third order, Minors and Cofactors, Properties of determinants. Matrices up to third order, Types of Matrices. Algebra of matrices, Adjoint and inverse of a matrix. Application of determinants and matrices to the solution of linear equation (in three unknowns)

**Unit 3:-Trigonometry :** Compound angles, Multiple and Sub-multiple angles, solution of trigonometric equations, Properties of triangles, Inverse circular function.

**Unit 4:- Co-ordinate Geometry of Two Dimensions :** Straight lines, pairs of straight lines, Circles, Equations of tangents and normals to a circle. Equations of Parabola, Ellipse and Hyperbola, Ellipse and hyperbola in simple

forms and their tangents (Focus, directix, eccentricity and latus rectum in all cases)

**Unit 5:-Co-ordinate Geometry of Three Dimensions:** Distance and division formulae, Direction cosines and direction ratios. Projections, Angles between two planes, Angle between a line and plane. Equations of a sphere-general equation.

**Unit 6: -Vector** Fundamentals, Dot and Cross product of two vectors, Scalar triple product, Simple Applications (to geometry, work and moment).

**Unit 7:-Differential Calculus :** Concept of limit, continuity, Derivation of standard functions, successive differentiation, simple cases, Leibnitz Theorem, Partial differentiation, Simple cases, derivatives as rate measure, Maxima and minima, indeterminate forms, Geometrical applications such as tangents and normals to plane curves.

**Unit 8:-Integral Calculus:-** Standard methods of integration ( substitution, by pars, by partial fractions etc.) Definite integrals and properties of Definite Integrals, Areas under plane curves, Differential Equations only simple cases such as

- (i)  $dy/dx = f(x)$
- (ii)  $dy/dx=f(x) g(y)$
- (iii)  $d^2y/dx^2 = f(x)$  and application to motions in a straight line.

**Unit 9:-Probability and Statistics :** Averages (Mean, Median and Mode), Dispersion (standard deviation and variance). Definition of probability, Mutually exclusive events, Independent events, Addition theorem.

### **COMPUTER AWARENESS**

**Computer Basics:** Organization of a Computer, Central Processing Unit (CPU), Structure of instructions in CPU, input/output devices, computer memory, back-up devices.

### **DATA REPRESENTATION**

Representation of characters, integers and fractions, binary and hexadecimal representations, Binary Arithmetic : Addition, subtraction, multiplication, division, simple arithmetic and two's complement arithmetic, floating point representation of numbers, Boolean algebra, truth tables, venn diagram.

### **ANALYTICAL ABILITY AND LOGICAL REASONING**

Questions in this section will test logical reasoning and quantitative reasoning.