Appendix - 1
MATHEMATICS (050)
CURRICULUM

Unit-1

FUNCTION

- Relation
  - Reflexivity
  - Symmetry
  - Transitivity
  - equivalance
- Function
  - One-one function
  - Many one function
  - Onto function
  - Into functin
- Composite function
- Inverse function
- Binary operation

UNIT-2

INVERSE TRIGONOMETRIC FUNCTION

- Defination - Inverse Trogonometric function
- Its Domain and Range
- Formula of Trigonometric inverse function and their graph
- Formula of additive inverse
- Multiplicative inverse formula
- Complementary inverse function formula
- Addition, subtraction formula
- Relation of three-inverse function

Unit-3

DETERMINANTS

- Second order Determinants
- Third order Determinants
- Expansion of Determinants

- Characteristics of Determinants
- Area of Triangle by Determinants
- Minor and Co-factor
- Solution of linear equations in two variables.
- Cartesian equation of line

Unit-4

MATRICES

- Defination, symbol and equality of matrics
- Types of matrics - Columnmatrix, Row Matrix, Square matrix, Diagonal matrix, Unit matrix, Scalar matrix, Zero matrix, Transpose of a matrix, Symetric matrix, Skew symmetric matrix
- Addition of matrices, product of a matrix with a scalar and its characteristics
- Differenace of two matrices
- Properties of addition and multiplication regarding Transpose of matrix
- Multiplication of matrices and properties of matrix multiplication (without proof)
- Determinant of a sqare matrix
- Adjoint of a matrix
- Inverse of matrix
- Non Singular Matrix and Singular Matrix with their important results
- Echelon method to find inverse of a matrix
- Solution of a system of linear equations using inverse of a matrix.

Unit-5

CONTINUITY AND DIFFERNETIABILITY

- Limit- Its defination and characteristics,Left hand limit and Right hand limit.
- Continuity - Its defination
- Algebra of continuous function (addition, subraction, multiplication & division)
- Continuity of trigonometric function and composite function.
- Exponential and Logarithmic function and its properties.

- Differentiation - Its defination. Derivative of a composite function, (chain rule), Differentiation of implict function, Derivative of trigonometric inverse function, derivative of trigonometric and logarithmic function, Derivative of parametric equation.
- Second order derivative.

$$\lim_{x\to 0}\frac{1}{x},\ \lim_{x\to\infty}\frac{1}{x}$$

Unit-6

APPLICATION OF DERIVATIVES

- Application of linear motion
- Relative Rate of change
- Approximate values
- Application of derivative to geometry (tangent, normal and angle between two curves)
- Rolles theorem and mean value theorem (without proof)
- Increasing and decreasing function
- Maximum and Minimum value of a function and its application.

Unit-7

INDEFINITE INTEGRATION

- Integration - Its defination and antiderivative form.
- Standard result of integration
- Method of substitution for integration
- $\int \frac{dx}{a\cos x + b\sin x + c}$ *and* $\int \sin^m x.\cos^n x dx$
- Integration by parts
- $\int \sqrt{x^2 \pm a^2}\ dx,\ \int \sqrt{a^2 - x^2}\ dx$

  $\int e^{ax}\cos(bx+c)dx,\ \int e^{ax}\sin(bx+c)\,dx$
- $\int \frac{dx}{ax^2+bx+c},\ \int \frac{dx}{\sqrt{ax^2+bx+c}}$

- $\int \frac{px+q}{ax^2+bx+c}dx,\ \int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$
- $\int \sqrt{ax^2+bx+c}\ dx,\ \int \sqrt{ax^2+bx+c}\ (px+q)\ dx$
- Method of partial function

Unit-8

DEFINITE INTEGRATION

- Definite Integral - Its defination and definite Integral as a limit of a sum
- Fundamental Principle of definite integration
- Working rule of definite integration
- Rule of substitution for definite integration
- Method of Integration by parts for definite integration
- Useful Results about definite integration

Unit-9

APPLICATION OF INTEGRALS

- Area : Line, circle, parabola, ellipse with Axes
- Area between two curves
- Area bounded by the curves y = sin$x$ and y = cos$x$

Unit-10

DIFFERENTIAL EQUATION

- Defination order and degree
- Solution of differential Equation
- General and particular solution
- To obtain differential equation from General Solution
- Various methods of solution of differential equations
- Variable separable method
- Homogeneous differential equation's and its solution
- Linear Differential equation and its solution
- Application of differential equation.

Unit-11

VECTOR ALGEBRA

- Introduction of vector space in R^2 and R^3
- Equality of two vectors

- Addition of vectors
- Multiplication of vector by scalar and its properties
- Magnitude of vector and unit vector
- Inner product
- Outer product
- Triple product
- Lagranges Identity
- Cauchy-Schwartz Inequality
- Triangle Inequality
- Collinear and Coplanar vectors
- Angle between two nonzero vectors
- Projection of vector
- Magnitude of projection of vector and its component
- Area of triangle and parallelogram
- Volume of parallelopiped
- Direction cosine, direction angle and direction ratio of a vector

Unit-12

THREE DIMENTIONAL GEOMETRY

- Line-Vector, cartesian and parametric equation

  Vector, cartesian and parametric equation of line passing through two distinct points.
- Necessary and sufficiant condition of three distinct points in the space to be collinear
- Measure of angle between two lines in space
- Conditions for intersection of two distinct lines
- Condition for coplanar and non-coplanar lines.
- Per Pendicular distance between two parallel Lines
- Per pendicular distance between two parallel lines
- Perpendicular distance between two skew lines.
- Plane Passing through three distinct non collinear points
- Different forms of equation of planes
- Intercept of a plane
- Equation of plane passing through A $(\bar{a})$ and having normal $\bar{n}$ through the origin.
- Equation of the plane using normal through the origin.
- Intersection of line and plane.

- Measure of angle between two planes
- Equation of plane passing through two parallel lines
- Equation of plane containing two intersecting lines
- Perpendicular distance from a point outside a place to the plane
- Distance between two parallel planes
- Angle between a line and a plane
- Intersection of two planes
- Equation of a plane passing through the intersection of two planes

Unit-13

PROBABILITY

- Random experiments, sample space, event and its probability'
- Conditional probability & its properties
- Multiplication rule of probability
- Total probability
- Bayes theorem
- Independent events
- Random variable and probability distribution
- Mathematical expectation - mean and variance and standard deviation
- Bernollis trials for Binomial distribution

Unit-14

LINEAR PROGRAMMING

- Linear programming problmes and its mathematical formula
- Different types of problems in linear programming.

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