

Govt. of Karnataka
Department of Collegiate and Technical Education

DCET-2022 SYLLABUS (Common to all branches)		
DURATION: 3Hours		MAXIMUM MARKS:100
Sl.No	PAPER	MARKS
1	APPLIED MATHEMATICS	50
2	APPLIED SCIENCE	50
TOTAL		100

1. APPLIED MATHEMATICS

(COMMON TO ALL BRANCHES)

Max Marks : 50 Marks

LINEAR ALGEBRA

Unit-1: MATRICES & DETERMINANTS:

07 Mark

Basic concepts of Matrices (Addition, Subtraction and Multiplication), Determinants: Problems on finding unknown quantity in a 2nd and 3rd order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3rd order).

Matrices: Minors, Cofactors, Adjoint and Inverse of matrices of 2nd order. Characteristic equation and roots of a square matrix.

ALGEBRA

Unit-2: VECTORS:

04 Marks

Magnitude of a vector. Position vector. Expression of vector in terms of position vectors. Vector in plane and in space in terms of unit vectors i, j and k respectively. Product of vectors. Scalar and vector product. Applications of dot and cross products i.e., Projection of vector on another vector, Area of parallelogram and area of triangle. Work done by a force and moment of force.

Unit-3: PROBABILITY:

01 Marks

Random Experiments, Sample Space, Events, Types of Events, Algebra of Events, Complementary event, the events A or B , A and B , A but not B , Mutually Exclusive Events, Exhaustive events, Simple problems.

TRIGONOMETRY

Unit-4: ALLIED ANGLES AND COMPOUND ANGLES:

08 Marks

Signs of Trigonometric ratios, Trigonometric ratios of Allied Angles in terms of θ . Formulae for $\sin(A \pm B)$, $\cos(A \pm B)$ & $\tan(A \pm B)$ and problems on them. Multiple and sub multiple angle

formulae for 2A & 3A and simple problems. Transformation formulae on sum or difference into products & products into sum or difference and problems on them.

Unit-5: Complex numbers:

01 Mark

Definition of complex number in the form of $a + ib$. Conjugate of complex number. Algebra of complex numbers, modulus and principal value of argument of complex number. Polar form $Z = r(\cos\theta + i\sin\theta)$.

INTRODUCTION TO CALCULUS

Unit-6: Limits:

04 Marks

Evaluation of limit of functions by factorization, rationalization, limits when $n \rightarrow \infty$. Problems on algebraic limits based on formula $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n \cdot a^{n-1}$. Problems on trigonometric limits based on formula $\lim_{\theta \rightarrow 0} \frac{\sin\theta}{\theta} = 1$

CO-ORDINATE GEOMETRY

Unit-7: Straight Lines:-

03 Marks

Problems on different forms of equations of straight lines such as:

$$y = mx + c, \quad (y - y_1) = m(x - x_1), \quad y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$

Problems on equation of lines through a point and parallel or perpendicular to a given line. Finding Slope, X-intercept and Y-intercept of general equation $ax + by + c = 0$.

DIFFERENTIATION

Unit-8:

08 Marks

Problems on rules of differentiation: (Sum rule, product rule and quotient rule). Problems on function of a function and inverse trigonometric functions. Derivative of implicit functions, and parametric functions and problems. Successive differentiation up to second order and problems on them. Differentiation of Logarithmic functions of types u^v , Where u and v are functions of x, Simple problems.

APPLICATIONS OF DIFFERENTIATION**03 Mark****Unit-9:**

Equations of tangent and normal to the curve $y = f(x)$ at a given point and problems. Derivative as a rate measure i.e. to find the rate of change of displacement, velocity, radius, area, volume using differentiation and problems on them.

INTEGRAL CALCULUS**06 Marks****Unit-10:**

Rules of integration and problems. Problems on integration by the method of substitution and by parts.

DEFINITE INTEGRALS**02 Mark****Unit-11:**

Simple problems on definite integrals. Problems on applications of definite integrals such as area and volume.

DIFFERENTIAL EQUATIONS**03 Mark****Unit-12:**

Order and Degree of Differential Equations, Formation of differential equation by eliminating arbitrary constants up to second order. Problems on solution of linear differential equations of first order by variable separable method and integrating factor method.