

Intermediate II YEAR -MATHEMATICS II (B)
(CO-ORDINATE GEOMETRY AND CALCULUS)

CO-ORDINATE GEOMETRY AND CALCULUS : 125 Periods

- 1) Circles 25
- 2) Systems of circles 08
- 3) Parabola 10
- 4) Ellipse 07
- 5) Hyperbola 07
- 6) Polar co-ordinates 08
- Total : 65

CALCULUS :

- 7) Successive Differentiation 08
- 8) Integration 18
- 9) Definite Integration 12
- 10) Numerical Integration 12
- 11) Differential Equations 10
- Total : 60

MATHEMATICS-II(B)

(CO-ORDINATE GEOMETRY AND CALCULUS)

DISTRIBUTION OF SYLLABUS INTO TOPICS'SUB-TOPICS.

Total: 125 Periods

1. CIRCLES :

- 1.1. Equation of a circle-Standard form-centre and radius-Equation of a circle with a given line segment as diameter- Equation of circle through three non-colinear points-parametric equations of a circle.
- 1.2. Position of a point in the plane of the circle- power of a point-Def. of a tangent-Length of tangent.
- 1.3. Position of a straight line in the plane of the circle-condition for a straight line to be a tangent – chord joining two points on a circle - equation of the tangent at a point on the circle – point of contact – Equation of normal.
- 1.4. Chord of contact-Pole, Polar-conjugate points and conjugate lines- Equation of chord with given mid point.
- 1.5. Relative positions of two circles-circles touching each other, -externally, internally, of common tangents-points of similitude-Equation of tangents from an external point.

2. SYSTEM OF CIRCLES:

- 2.1. Angle between two intersecting circles-conditions for orthogonality
- 2.2. Radical axis of two circles-properties-Common chord and common tangent of two circles, Radical centre.
- 2.3. Coaxial system of circles-Equation of the coaxial system in the simplest form-limiting points of a coaxial system.
- 2.4. Orthogonal system of a coaxial system of circles

3. PARABOLA:

- 3.1. Conic sections-parabola-Equation of parabola in standard form-Different forms of parabola-parametric equations.
- 3.2. Equation of tangent and normal at a point on the parabola (cartesian and parametric)-condition for a straight line to be a tangent.
- 3.3. Pole and Polar-Finding the pole of a given line and Vice Versa.

4. ELLIPSE:

- 4.1. Equation of Ellipse in standard form, parametric equations.

- 4.2. Equation of tangent and normal at a point on the Ellipse (Cartesian and parametric) condition for a straight line to be a tangent.
 4.3. Pole and Polar-Finding the pole of a given line and Vice Versa

5. HYPERBOLA:

- 5.1. Equation of hyperbola in standard form-parametric equations, Rectangular Hyperbola.
 5.2. equation of tangent and normal at a point on the hyperbola (Cartesian and parametric) condition for a straight line to be a tangent. Asymptotes.
 5.3. Pole and Polar – Finding the pole of a given line and Vice Versa.

6. POLAR COORDINATES:

- 6.1. Polar coordinates-Relation between polar and cartesian coordinates-Distance between two points Area of a triangle.
 6.2. Polar equation of a straight line, circle and a conic

7. CALCULUS:

- 7.1 Successive Differentiation – Introduction of nth derivative of $(ax+b)^n$, $1/(ax+b)$, $\log(ax+b)$, e^{ax+b} , $\sin(ax+b)$, $\cos(ax+b)$
 7.2 Leibnitz theorem and its application

8. INTEGRATION :

- 8.1. Integration as the inverse process of differentiation standard forms-properties of integrals.
 8.2. Integration by method of substitution covering algebraic, trigonometric and exponential functions. Integration by parts-logarithmic functions-inverse trigonometric functions-Integrals of the following types of functions:

$$\int 1/x^2 + a^2, \int 1/a^2 - x^2, \int 1/\sqrt{x^2 + a^2}, \int 1/\sqrt{a^2 - x^2}$$

$$\int 1/ax^2 + bx + c, \int \frac{px+q}{ax^2 + bx + c}, \int \frac{px+q}{\sqrt{ax^2 + bx + c}},$$

$$\int \sqrt{x^2 + a^2}, \int \sqrt{a^2 - x^2}, \int \sqrt{ax^2 + bx + c}, \int (px+q)\sqrt{ax^2 + bx + c}$$

$$\int 1/a + b \sin x, \int 1/a + b \cos x,$$

$$\int 1/(ax+b)\sqrt{px+q}$$

- 8.3. Integration of rational functions using partial Fractions.
 8.4. Reduction formulae.

9. DEFINITE INTEGRATION :

- 9.1. Interpretation of definite integral as an area-Fundamental theorem of calculus (without proof) properties of definite integrals-Evaluation of definite integral.
 9.2. Reduction formulae for evaluation of integral m, n are positive integers.

10. NUMERICAL INTEGRATION:

- 10.1. Determination of plane areas in Volving second degree curves-Areas under the curves $\sin x$ and $\cos x$.
 10.2. Trapezoidal Rule and simpson's Rule (without proof)-simple applications

11. DIFFERENTIAL EQUATIONS :

- 11.1. Formation-general and particular solutions and primitives-Degree and order of an ordinary differential equation.
 11.2. Solutions of the first order and first degree equations of the following types
 (i) Variables separable
 (ii) Equations of the type $dy/dx = f(x,y)/g(x,y)$, where f and g are homogenous functions in x and y
 (iii) Equations of the type $dy/dx = ax + by + c/a'x + b'y + c'$ where a, b, c, a', b', c' , are constants)
 (iv) Equations of the type (linear) $dy/dx + py = Q$ where P, Q are functions of x .