DETAILED SYLLABUS FOR OASIS (Class 11 & 12)

Areas	Chapter with Sub-topics
Statistics and Data Science	**1. Relations and Functions** • Sets and their representation. • Union, intersection, and complement of sets and their algebraic properties. • Power-set • Relation, Types of relations, equivalence relations. • Functions; one-one, into and onto functions, the composition of functions **2. Permutation and Combination** • The fundamental principle of counting. • Permutation as an arrangement and combination as a selection. • Meaning of P (n,r) and C (n,r). Simple applications **3. Binomial Theorem** • Binomial theorem for a positive integral index. • General term and middle term. • Properties of Binomial coefficients and simple applications. **4. Conditional Probability** • Probability Distribution • Random Variables • Multiplication of Probability • Bayes Theorem • Bernoulli Trials

Commercial Mathematics	**5.Functions**
	• Linear Equation of One Variable
	• Linear Equation of Two Variables
	• Quadratic Equation
	  • Quadratic equations in real and complex number system and their solutions.
	  • Relation between roots and coefficients, nature of roots, the formation of quadratic equations with given roots.
	• Polynomials

Linear Algebra	**6.Matrices** • Algebra of matrices, types of matrices, and matrices of order two and three. **7.Determinants** • Properties of determinants, evaluation of determinants, the area of triangles using determinants. • Adjoint and evaluation of inverse of a square matrix using determinants and elementary transformations. • Test of consistency and solution of simultaneous linear equations in two or three variables using determinants and matrices. **8.Vectors** • Scalars and Vectors. Addition, subtraction, multiplication, and division of vectors. • Vector's Components in 2D and 3D space. • Scalar products and vector products, triple product **9.Linear Programing**

Areas	Detailed Syllabus
Calculus	**10. Measuring Changes** • Straight Lines • Limits and Derivatives **11. Continuity and Differentiability** • Real-valued functions, algebra of functions, polynomials, rational, trigonometric, logarithmic and exponential functions, inverse functions. • Graphs of simple functions. • Limits, continuity, and differentiability. • Differentiation of the sum, difference, product, and quotient of two functions. • Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite, and implicit functions; derivatives of order up to two. • Rolle's and Lagrange's Mean Value Theorems. • Applications of derivatives: Rate of change of quantities, monotonic increasing and decreasing functions, Maxima, and minima of functions of one variable, tangents, and normal. **12. Integral Calculus** • Integral as an anti-derivative. • Fundamental integrals involving algebraic, exponential and logarithmic functions. • Integration by substitution, by parts, and by partial fractions. • Integration using trigonometric identities. • Integral as limit of a sum. • Evaluation of simple integrals • Fundamental Theorem of Calculus. • Properties of definite integrals, evaluation of definite integrals, determining areas of the regions bounded by simple curves in standard form. **13. Differential Equations** • Ordinary differential equations, their order, and degree. • Formation of differential equations. • The solution of differential equations by the method of separation of variables. • The solution of homogeneous and linear differential equations

Mathematical Reasoning and Modelling	**14. Reasoning and Modelling**
	• Statements and logical operations: or, and, implied by, implies, only if and if.
	• Understanding of contradiction, tautology, contrapositive and converse.
	  • Arithmetic and Geometric progressions
	  • Geometric means between two given numbers.
	  • The relation between A.M. and G.M.