

BARGAON INSTITUTE OF TECHNOLOGY

DEPT. OF BASIC SCIENCE & HUMANITIES

DISCIPLINE: All Branches

SEMESTER: 1st and 2nd

FROM: _____ TO: _____

NAME OF THE FACULTY: _____

SUBJECT: MATHEMATICS

TOTAL CLASS AVAILABLE IN SEMESTER: 128

NO. OF PERIODS: 04 / WEEK (32 WEEKS)

SL. NO.	WEEK	CLASS DATE	NO. OF CLASS / DAY	TOPICS PLANNED TO BE COVERED	Signature
01	01			1.1 Concept of angles, measurement of angles in degrees, grades and radians and their Conversions.	
				1.1 Continued: Conversion problems between degree, grade, and radian systems.	
				1.2 T-Ratios of Allied angles (without proof) & simple problems.	
				1.2 T-Ratios of Allied angles: Applications and evaluation of standard expressions.	
02	02			1.2 Sum and difference formulae of T-Ratios.	
				1.2 Product formulae & Transformation of product to sum, difference and vice versa.	
				1.2 Applications of Sum, Difference, and Product formulae.	
				1.3 T- Ratios of multiple angles (2A, 3A).	
03	03			1.3 T- Ratios of sub-multiple angles (A/2).	
				1.3 Applications and numerical problems on multiple and sub-multiple angles.	
				1.4 Introduction to Inverse Trigonometric functions.	

				1.4 Properties of Inverse Trigonometric functions (without Proof).	
04	04			1.4 Numerical problems based on Inverse Trigonometric functions.	
				1.4 Advanced problem-solving on Unit-1 Trigonometry.	
				UNIT 2 - CO-ORDINATE GEOMETRY 2.1 Introduction to Co-ordinate Geometry. Distance formula.	
				2.1 Section formula (Internal and External division) & centroid of triangle.	
05	05			2.2 Slope of a line. Relationship between slope of perpendicular and parallel lines.	
				2.3 Equation of straight line in various standard forms (slope-intercept, point-slope, two-point).	
				2.3 Equation of straight line in intercept form and normal form (without proof).	
				2.4 Intersection of two straight lines and condition of concurrence.	
06	06			2.4 Angle between two lines and applications.	
				2.5 Perpendicular distance from a given point to a line.	
				2.5 Distance between two parallel lines & simple problems.	
				2.6 Centre and radius of a Circle. General equation of a circle.	
07	07			2.7 Equation of a circle Passing through three given points.	
				2.8 Equation of circle when two end points of a diameter are given.	
				2.8 Practice problems on Circle equations and standard forms.	
				UNIT 3 - ALGEBRA 3.1 Complex Numbers: Definition of complex number. Real and imaginary parts.	

08	08			3.1.2 Polar and Cartesian representation of a complex number and its conversion from one form to other.	
				3.1.3 Conjugate of a complex number, Modulus and Amplitude of a complex number.	
				3.1.4 Addition, Subtraction, Multiplication and Division of a complex number.	
				3.1.5 Square root of a complex number.	
09	09			3.1.6 Cube roots of unity and their properties.	
				3.1.7 De-moivre's theorem (statement only) and its simple applications.	
				3.2 Partial fractions: Definition of Polynomial, Proper & Improper fractions, Definition of partial fractions.	
				3.2.2 Resolve proper fraction into partial fractions with denominator containing non-repeated linear factors.	
10	10			3.2.3 Resolve proper fraction into partial fractions with denominator containing repeated linear factors.	
				3.2.4 Resolve proper fraction into partial fractions with denominator containing non-repeated irreducible quadratic factors.	
				3.3 Permutations and Combinations: Factorial of a non-negative integer. Fundamental principle of counting.	
				3.3.2 Determine $P(n,r)$ and $C(n,r)$ with basic applications.	
11	11			3.3.3 Binomial theorem (without proof) for positive integral index.	
				3.3.4 Determination of general term and Middle term in binomial expansion.	
				3.4 Determinants and Matrices: Introduction to matrices. Order of a matrix. Types of matrices.	
				3.4.2 Addition, Subtraction, Scalar multiplication of matrices.	
12	12			3.4.2 Multiplication of matrices and properties.	

				3.4.3 Introduction to determinant. Expansion of determinant up to 3rd order.	
				3.4.4 Properties of determinants.	
				3.4.4 Applications of properties of determinants in evaluation.	
13	13			3.4.5 Minors and Co-factors of a matrix.	
				3.4.5 Adjoint and Inverse of a matrix.	
				3.4.6 Solution of system of linear equations by Crammer's rule up to 3 variables.	
				3.4.7 Solution of system of linear equations by matrix method up to 3 variables.	
14	14			3.4.7 Practice session on Crammer's Rule and Matrix Inversion Method.	
				UNIT 4 - VECTOR ALGEBRA 4.1 Vector and Scalar Quantities. Representation of a vector.	
				4.2 Notation and rectangular resolution of a vector.	
				4.3 Types of vectors (null, unit, position, co-initial, collinear).	
15	15			4.4 Addition, subtraction and scalar multiplication of vectors.	
				4.5 Scalar product (dot product) of two vectors and its properties.	
				4.5 Vector product (cross product) of two vectors and its properties.	
				4.6 Angle between two vectors.	
16	16			4.7 Scalar and Vector projection of a vector on another vector.	
				4.8 Area of a triangle and Area of a parallelogram using vectors.	

				4.9 Simple problems related to work and moment of a force.	
				4.9 Revision and problem-solving on Vector Algebra.	
17	17			UNIT 5 - CALCULUS 5.1 Limits and Continuity: 5.1.1 Define function.	
				5.1.2 Types of functions (Constant, Identity, Absolute value, Greatest integer, Trigonometric, Exponential, Logarithmic).	
				5.1.3 Define limit of a function and Existence of limit of a function.	
				5.1.4 Algebra of limits.	
18	18			5.1.5 Limit of standard functions: $\lim_{x \rightarrow a} (x^n - a^n)/(x - a) = n a^{n-1}$.	
				5.1.5 Limit of standard functions: $\lim_{x \rightarrow 0} (\sin x / x) = 1$ and $\lim_{x \rightarrow 0} (a^x - 1)/x = \ln a$.	
				5.1.5 Limit of standard functions: $\lim_{x \rightarrow 0} (1 + x)^{1/x} = e$.	
				5.1.6 Limit of $ x $ and $[x]$.	
19	19			5.1.7 Evaluation of limits using standard formulas.	
				5.1.8 Test of Continuity of a function at a point.	
				5.2 Differentiation: 5.2.1 Differentiation of algebraic functions, exponential function, logarithmic function.	
				5.2.1 Differentiation of trigonometric and inverse trigonometric functions (without proof).	
20	20			5.2.2 Differentiation of sum, product and quotient of functions.	
				5.2.3 Differentiation of function of a function (Chain Rule).	
				5.2.4 Differentiation using logarithm.	
				5.2.5 Differentiation of a function w.r.t another function.	

21	21			5.2.5 Derivative of implicit and parametric functions.	
				5.2 Practice and problem solving on Differentiation.	
				UNIT 6 - INTEGRAL CALCULUS & DIFFERENTIAL EQUATIONS 6.1 Integral Calculus: 6.1.1 Integration as inverse process of differentiation.	
				6.1.1 Standard integration formulas for basic algebraic, exponential and trigonometric functions.	
22	22			6.1.2 Simple integration by substitution (Type I).	
				6.1.2 Integration by substitution involving trigonometric identities (Type II).	
				6.1.3 Integration by parts: Concept and ILATE rule.	
				6.1.3 Applications of Integration by parts.	
23	23			6.1.4 Integration using partial fractions (for linear factors only).	
				6.1.4 Complex problems on Integration using partial fractions.	
				6.1.5 Definite integrals of some simple functions.	
				6.1.6 Properties of definite integrals (without proof) - Part 1.	
24	24			6.1.6 Properties of definite integrals (without proof) - Part 2.	
				6.1.6 Evaluation of definite integrals using properties.	
				6.1.7 Simple problem on evaluation of area bounded by a curve and axes.	
				6.1.7 Area bounded by standard curves (circle, parabola, line).	
25	25			6.2 Differential Equation: 6.2.1 Introduction to Differential Equation.	

				6.2.1 Order and degree of a differential equation.	
				6.2.2 Formation of differential equation.	
				6.2.3 Solution of first order and first-degree differential equation by variable separable method.	
26	26			6.2.3 Practice problems on Variable Separable method.	
				6.2.4 Solution of linear differential equations ($dy/dx + Py = Q$).	
				6.2.4 Integrating factor and general solution of linear differential equations.	
				6.2.4 Applications of Linear Differential Equations.	
27	27			Comprehensive Review: Trigonometry (Unit 1) - Key formulas & typical exam questions.	
				Comprehensive Review: Co-ordinate Geometry (Unit 2) - Straight lines & Circles.	
				Comprehensive Review: Complex Numbers & Partial Fractions (Unit 3.1 & 3.2).	
				Comprehensive Review: Permutations, Combinations & Binomial Theorem (Unit 3.3).	
28	28			Comprehensive Review: Determinants & Matrices (Unit 3.4).	
				Comprehensive Review: Vector Algebra (Unit 4).	
				Comprehensive Review: Limits and Continuity (Unit 5.1).	
				Comprehensive Review: Differentiation techniques (Unit 5.2).	
29	29			Comprehensive Review: Indefinite Integration & Substitution Methods.	
				Comprehensive Review: Integration by Parts & Partial Fractions.	
				Comprehensive Review: Definite Integrals and Area under	

				Curves.	
				Comprehensive Review: Differential Equations.	
30	30			Internal Assessment / Model Test Paper Discussion - Set 1.	
				Internal Assessment / Model Test Paper Discussion - Set 2.	
				Doubt Clearing Session: Units 1 to 3.	
				Doubt Clearing Session: Units 4 to 6.	
31	31			Previous Year Question Paper Analysis - Section A (Short Questions).	
				Previous Year Question Paper Analysis - Section B (Medium Questions).	
				Previous Year Question Paper Analysis - Section C (Long Answer Questions).	
				Guidance on Examination Strategy, Marking Scheme, and Time Management.	
32	32			Final Revision: Core Formulas in Trigonometry & Calculus.	
				Final Revision: Coordinate Geometry & Vectors.	
				Final Revision: Matrices, Determinants & Differential Equations.	
				Final Academic Review & Course Wrap-up.	

Signature of Faculty

Principal