Tura Government College :: Mathematics Department

Syllabus Distribution 2023-24

Name	**Semester 1** **MTH 100 (Fundamental Mathematics)**	**Semester 1** **MDC 118 (Mathematics in Daily Life)**
Shri. M. Deka	**Unit IV** : Polynomials over Z, Q, R, C - definition and standard properties; Division Algorithm; gcd, Euclidean Algorithm, Unique Factorisation Theorem over Q, R, C (statement and application); root of a polynomial; detailed study of the roots of a polynomial; Fundamental Theorem of Algebra (statement and corollary) and its failure over Z, Q, R; Remainder Theorem and Factor Theorem; Synthetic division; multiple roots; complex roots and surd roots; Descartes' rule of signs; Relation between roots and coefficients of a polynomial; symmetric functions of roots with special reference to cubic equations; n^{th} roots of unity; De Moivre's Theorem and its applications; Euler's Theorem (statement only); solution of a cubic equation by Cardan's Method.	-
Shri. S R. Debnath	**Unit I** : Intermediate Value Theorem and its applications **Unit II** : Leibnitz's Theorem. **Unit III** : Applications of definite integral - area under a curve, length of simple plane curves **Unit IV** :Complex Numbers - properties; polar representation;	UNIT 3 - All
Smt. Idaphinia Warjri	**Unit I** : ε-δ definition of limit of a real valued function; standard theorems; limit at infinity and infinite limits; ε-δ definition of continuity of a real valued function; standard theorems; geometrical interpretation of continuity; discontinuity - types of discontinuity; properties of continuous functions; fixed point theorem; location of roots - theorem and its application.	UNIT 1-Unit conversion (length, mass, time); Number System; Decimal Fractions; Square Roots and Cube Roots; Problems on Numbers; Problems on Ages;
Shri.Fabian T Marbaniang	**Unit II** : Differentiability of a real-valued function of a real variable; geometrical significance; standard theorems; stationary point; local extrema; Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem and their applications; differentiability and monotonicity; concavity; inflection point; differential; successive differentiation;	UNIT 1- Use of concepts of HCF and LCM; Percentage; Ratio and Proportion; Time and Distance; Allegations or Mixture;
Shri. Tyngshainstar L Mawlong	**Unit III** : Integral Calculus (15 hours) Definite Integral as a limit of a sum; fundamental theorem of integral calculus; properties of definite integral;Application of Definite integral - volume and surface areas of solids of revolution in standard cases; reduction formulas for $\int sin^n x\,dx, \int cos^n x\,dx, \int tan^n x\,dx, \int e^{ax}x^n dx, \int x^n log\, x^n dx, \int sin^n x\, cos^n x dx$	**UNIT 1**- Area, Volume, Surface Areas; Trigonometric ratios; Height and Distance in our everyday life.

Name	Semester 2 (MTH-150: Fundamental Mathematics-II)	Semester 2 (MDC 163) Fundamental of Statistics
Shri. M. Deka	-	MDC163-
Shri. S R. Debnath	-	MDC163-
Smt. Idaphinia Warjri	**Unit I : Two Dimensional Geometry** Conics - General equation of second degree, reduction to standard form, equation of tangents, conditions of tangency, equation of normal, parametric form of conics, conjugate diameters of ellipse and hyperbola. **Unit II - All**	-
Shri.Fabian T Marbaniang	**Unit III : All** **Unit IV : Vector Calculus** Gradients of real-valued functions of two or three variables - physical and geometrical significance, and elementary properties; Directional derivatives of real-valued functions of two or three variables and its geometrical significance, maximum directional derivative; Tangent planes and normal lines. Divergence \& Curl - physical and geometrical significance, and elementary properties; Solenoidal and irrotational vector fields.	-
Shri. Tyngshainstar L Mawlong	**Unit I : Two Dimensional Geometry** Transformation of coordinates - Change of axes, invariants, removal of xy term. Pair of straight lines - General and homogeneous equations of second degree, angles between pair of straight lines represented by a second degree equation, bisectors of the angles between a pair of straight lines through the origin. **Unit IV : Vector Calculus** Scalar and vector products of three and four vectors - properties, geometrical significance, and applications. Vector-valued functions of real variables ($f: R \rightarrow R^2$, $f: R \rightarrow R^3$) ; Derivative of a vector- valued function of a real variable; Properties and geometrical applications - arc length, unit tangent vector, normal vector, curvature.	-

Name	Semester III	Semester IV	Semester V	Semester VI
Shri. M. Deka	GHS31 UNIT V	GHS41 UNIT II	H51 UNIT II & H54 UNIT II	H62 UNIT III
Shri. S R. Debnath	GHS31 UNIT I	GHS41 UNIT I	H51 UNIT I &H52 UNIT III	H61 UNIT II & H62 UNIT I
Smt. Idaphinia Warjri	GHS31 UNIT II	GHS41 UNIT V	H51 UNIT II & H52 UNIT I	H61 UNIT I & H62 UNIT II
Shri.Fabian T Marbaniang	GHS31 UNIT IV	GHS41 UNIT IV	H53 UNIT I & II	HOP1 UNIT I, II III & Practical 1
Shri. Tyngshainstar L Mawlong	GHS31 UNIT III	GHS41 UNIT III	H54 UNIT I & III	HOP1 UNIT IV, V & Practical 2

HOD
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