LORETO COLLEGE
Department of Mathematics

TIME PLAN 2024-2025

Name of the teacher: Dr Satyabrota Kundu
Initials   : SK

Teaching Objectives:
- To impart comprehensive knowledge in theoretical and empirical perspectives on the core mathematical issues.
- To indoctrinate the fundamental mathematical tools required for empirical appraisal of various mathematical problems.
- To give exposure to analytical and logical matters subsumed in mathematical theories.

1st Semester Topic-wise Time Plan

Topics	Hours allotted	Topics (as per curriculum)	Teaching method	Learning outcome (output)	Assessment
Calculus	25	1. Differentiability of a function at a point and in an interval. Meaning of sign of derivative. Differentiating hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to functions of type $eax+b\sin x$,	Class lecture and problem-solving sessions. Revisions and doubt clearing slots	Achieve a fervent understandingng of basic algebra.	Class test and home assignments

		$e^{ax+b}\cos x$, $(ax+b)^n \sin x$, $(ax+b)^n \cos x$. Indeterminate forms. L'Hospital's rule (statement and example). 2. **Reduction formulae, derivations and illustrations of reduction formulae of the type** $\int \sin^n x \, dx$, $\int \cos^n x \, dx$, $\int \tan^n x \, dx$, $\int \sec^n x \, dx$, $\int (\log x)^n dx$, $\int \sin^n x \sin^m x \, dx$, $\int \sin^n x \cos^m x \, dx$. **Parametric equations, parametrizing a curve, arc length of a curve, arc length of parametric curves, area under a curve, area and volume of surface of revolution.**			

Geometry	35	1. Rotation of axes and second degree equations, classification of conics using the discriminant, reduction to canonical form, tangent and normal, polar equations of conics.	Class lecture and problem-solving sessions. Revisions and doubt clearing slots	Gather theoretical insights of the fundamental calculus.	Class test and home assignments
		2. Spheres. Cylindrical surfaces. Central conicoids, paraboloids, plane sections of conicoids, generating lines, identification of quadric surfaces like cone, cylinder, ellipsoid, hyperboloid, classification of quadrics.			
Vector Analysis	25	1. Triple product, vector equations, applications to geometry and mechanics — concurrent forces in a plane, theory of couples, system of parallel forces. Introduction to vector functions, operations with vector-valued functions, limits and continuity of vector functions, differentiation and integration of vector functions of one variable	Class lecture and problem-solving sessions. Revisions and doubt clearing slots	Getting skilled in problem solving techniques	Class test and home assignments

				Developing a strong aptitude in making basic aspects of Geometry.	Class test and home assignments