

**Serampore Girls' College**  
**Department of Mathematics**

**Lesson plan for three-year B.Sc. in Mathematics**  
**(General)**  
*Under*  
**CBCS System**

Semester	Paper	Unit/Module	Topic	Hours	Faculty Name
I	CC1/GE1	Unit-1 Algebra-1	Complex Numbers	4	M.N
			Polynomials	5	
			Rank of a matrix	1	
		Unit-2 : Differential Calculus-I	Number system	1	
			Function	1	
			Derivative	2	
			Successive derivative	1	
			Function of 2/3 variables	6	
			Curvature	1	
			Asymptote	1	
			Singular point	1	
			Envelop	1	
			Unit-3 : Differential Equation-I	Order, degree and solution of an ordinary differential equation	
		Exact equations		1	
		Euler's and Bernoulli's equations		1	
		Clairaut's Equations		1	
		Second order linear equations		1	
		Euler's Homogeneous equations		1	
		variation of parameters		1	
		Method of undetermined coefficients.	1		
Unit-4 : Coordinate Geometry	Transformations of Rectangular axes	1			
	General equation of second degree	3			
	Pair of straight lines	3			
	pair of tangents	1			
	chord of contact	1			

			poles and polars	2	
			Sphere and its tangent plane	2	
			Right circular cone	1	

Semester	Paper	Unit/Module	Topic	Hours	Faculty Name
II	CC2/GE2	Unit-1 : Differential Calculus-II	Sequence of real numbers	2	M.N
			series of constant terms	2	
			Rolle's Theorem	1	
			Mean value theorems of Lagrange and Cauchy	1	
			Taylor's and Maclaurin's Theorems	2	
			L'Hospital's Rule	1	
			Maxima and Minima	1	
			Lagrange's Method of undetermined multiplier	1	
		Unit-2 : Differential Equation-II	Linear homogeneous equations	1	
			Linear non-homogeneous equations	2	
			variation of parameters	1	
			Cauchy-Euler equation	1	
			Simultaneous differential equations	1	
			Eigenvalue problem	1	
			Order and degree of partial differential equations	1	
			Formation of first order partial differential equations	1	
			Lagrange's method	1	
		Charpit's method	1		
		Unit-3 : Vector Algebra	Addition, multiplication with scalar, Collinear and Coplanar Vectors	1	
			Scalar and Vector products of two and three vectors	3	
			applications to problems of Geometry	1	
			Vector equation of plane and straight line, Applications to Mechanics	2	
				1	
		Unit-4 : Discrete	Principle of Mathematical Induction. Division	1	

		Mathematics	algorithm		
			Prime Integers	2	
			Linear Diophantine equations	1	
			Congruences	1	
			Linear congruences	1	
			Chinese Remainder Theorem	1	
			System of Linear congruences	1	
			Application of Congruences	3	
			Congruence Classes, Fermat's little theorem. Euler's theorem. Wilson's theorem.	3	
			Boolean algebra	3	

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III	CC3/GE3	Unit-1 : Integral Calculus	Definite integrals.Evaluation	1	M.N
			Reduction formulae	1	
			Improper Integrals	1	
			Beta and Gamma functions	2	
			double integral.	1	
			Rectification	1	
			volume and surface areas	1	
		Unit-2 : Numerical Methods	Error	1	
			Operators	1	
			Interpolation: Difference table	1	
			Newton's Forward Interpolation	1	
			Newton's Backward Interpolation	1	
			Lagrange's Interpolation	1	
			Trapezoidal and Simpson's 1/3-rd formula	2	
			tabular method, Bisection method	1	
		Unit-3 : Linear Programming	Newton-Raphson method	1	
			Formulation of L.P.P	1	
			Convex set, Hyperplane	1	
			Basic Feasible Solutions (B.F.S.).	1	
			A.B.F.S. to an L.P.P.	1	
Solution by graphical	2				

			method		
			simplex method	2	
			Duality	1	
			Transportation	3	
			Assignment	2	

Semester	Paper	Unit/Module	Topic	Hours	Faculty Name
IV	CC4/GE4	Unit-1 : Algebra-II	Group Theory	2	M.N
			sub- group	1	
			Ring,	1	
			Field	1	
			Vector space	2	
			Real Quadratic Form	2	
			Eigen Values and Eigen Vectors	1	
			Cayley-Hamilton Theorem	1	
		Unit-2 : Computer Science & Programming	Computer Generation	1	
			Operating System, hardware and Software	1	
			Positional Number System.	1	
			Storing of data in a Computer	1	
			Programming Language	2	
			Algorithms and Flow Charts	2	
			FORTRAN 77/90	6	
		Unit-3 : Probability & Statistics	Elements of probability Theory	4	
			Random Variable and its Expectation	2	
			Probability Distribution Discrete and Continuous	2	
			Elements of Statistical Methods	1	
			Tabulation Chart and Diagram	1	
	Measures of Central tendencies	2			
	Measures of Dispersions	3			

			Sampling Theory	3	
			Estimation and Test of Significance	3	
			Statistical Hypothesis	3	
			Bivariate Frequency Distribution	2	

Semester	Paper	Unit/Module	Topic	Hours	Faculty Name
V	DSE A: Graph Theory		Definition, examples and basic properties of graphs	3	M.N
			Complete graphs, bi-partite graphs, isomorphism of graphs	5	
			Paths and circuits	2	
			Eulerian circuits	2	
			Hamiltonian cycles	2	
			Adjacency matrix	3	
			weighted graph, travelling salesman's problem	1	
			Dijkstra's algorithm,	2	
			Floyd-Warshall algorithm.	2	
			Definition of Trees and their elementary properties	5	
			Definition of Planar graphs, Kuratowski's graphs	5	

Semester	Paper	Unit/Module	Topic	Hours	Faculty Name
V	SEC A:- Object Oriented Programming in C++	Unit-1	characteristics of object oriented programming languages, brief history of C++, structure of C++ program, differences between C and C++	2	M.N
			basic C++ operators, Comments, working with variables,	2	
			enumeration, arrays and pointer	2	
		Unit-2	Objects, classes	2	
			constructor and destructors	1	
			friend function, inline function	1	
			encapsulation, data abstraction, inheritance, polymorphism	2	
			dynamic binding, operator overloading, method overloading, overloading arithmetic operator and comparison operators	2	
		Unit-3	Template class in C++, copy constructor, subscript and function call operator	2	
				2	
			concept of namespace	1	
			exception handling	1	

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VI	DSE B: Advanced Calculus		Point-wise and Uniform convergence of sequence of functions	5	M.N
			Point-wise and Uniform convergence of series of functions	5	
			Power series	4	
			Periodic Fourier series	5	
			Laplace Transform and its application to ordinary differential equation.	7	

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VI	SEC B: Boolean Algebra		ordered sets	2	M.N
			duality principle, maximal and minimal elements	2	
			lattices	2	
			sublattices	2	
			modular and distributive lattices	2	
			homomorphisms	1	
			Boolean algebras	3	
			Boolean polynomials	2	
			minimal forms of Boolean polynomials	3	
			Quinn-McCluskey method	1	
			Karnaugh diagrams,	2	
			switching circuits and minimization of switching circuits using Boolean algebra	4	