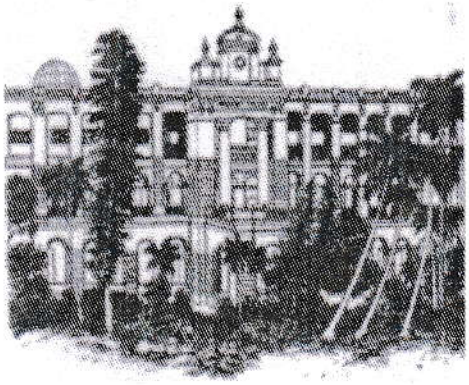
PRESIDENCY UNIVERSITY

DEPARTMENT OF MATHEMATICS

Syllabus for two-year M.Sc. Programme in Mathematics
(effective from the academic session 2021-22)

PRESIDENCY UNIVERSITY
KOLKATA



Department of Mathematics
(Faculty of Natural and Mathematical Sciences)
Presidency University
Hindoo College (1817-1855), Presidency College (1855-2010)
86/1, College Street, Kolkata - 700 073
West Bengal, India

Course Structure for two-year M.Sc. Programme in Mathematics (with effect from the academic session 2021-22) Semester-wise distribution of Courses

Semester	Paper Code	Name of the Courses	Page Number	Full Marks	Credit Point	Classes per week	Course Type †
I	MATH0701	Algebra - I	3	50	4	4 hr	T
	MATH0702	Topology - I	4	50	4	4 hr	T
	MATH0703	Ordinary Differential Equations	5	50	4	4 hr	T
	MATH0791	Classical Mechanics	6	50	4	4 hr	S
	MATH0792	Complex Analysis	7	50	4	4 hr	S
		Total		**250**	**20**	**20 hr**	
II	MATH0801	Algebra - II	8	50	4	4 hr	T
	MATH0802	Geometry - I	9	50	4	4 hr	T
	MATH0803	Operations Research	10	50	4	4 hr	T
	MATH0891	Measure and Probability	11	50	4	4 hr	S
	MATH0892	Mathematical Methods - I and Graph Theory	13	50	4	4 hr	S
		Total		**250**	**20**	**20 hr**	
III	MATH0901	Partial Differential Equations	14	50	4	4 hr	T
	MATH0902	Functional Analysis	15	50	4	4 hr	T
	MATH0903	Elective - I (E - I) *	2	50	4	4 hr	T
	MATH0991	Mathematical Methods - II and Number Theory	16	50	4	4 hr	S
	MATH0992	Project **	2	50	4	4 hr	S
		Total		**250**	**20**	**20 hr**	
IV	MATH1001	Algebra - III	18	50	4	4 hr	T
	MATH1002	Dynamical Systems	19	50	4	4 hr	T
	MATH1003	Elective - II (E - II) *	2	50	4	4 hr	T
	MATH1091	Mathematical Computing with Python	21	50	4	4 hr	S
	MATH1092	Dissertation **	2	50	4	4 hr	S
		Total		**250**	**20**	**20 hr**	
		Grand Total		**1000**	**80**		

† In Course Type, 'T' stands for Theory and 'S' stands for Sessional papers. The methods of assessments for Theory and Sessional papers are as follows:

- Theory: Internal Assessment (15 marks) + Semester Examination (35 marks)
- Sessional: Continuous evaluation throughout the semester.

Avishik Adhikari
19/09/2023

Head
Department of Mathematics
Presidency University
Kolkata

PRESIDENCY UNIVERSITY, KOLKATA

Syllabus for two-year **MATHEMATICS M.Sc.** Course
(with effect from Academic Session 2017-18)

Outline of the Syllabus

Module	Topic	Marks
Semester I (250 Marks)		
M701	Algebra - I (Groups & Rings)	50
M702	Complex Analysis	50
M703	Topology - I (General Topology & Covering Spaces)	50
M791	Differential Equations & Dynamical Systems	50
M792	Graph Theory & Combinatorics	50
Semester II (250 Marks)		
M801	Linear Algebra & Modules	50
M802	Measure Theory	50
M803	Geometry - I (Differentiable Manifolds)	50
M891	Stochastic Processes	50
M892	Optimization	50
Semester III (250 Marks)		
M901	Algebra - II (Fields & Galois Theory)	50
M902	Functional Analysis	50
M903	Topolgy - II (Fundamental Groups & Homology)	50
M991	Elective Course	50
M992	Elective Course	50
Semester IV (250 Marks)		
M1001	Partial Differential Equations & Distributions	50
M1002	Geometry - II (Riemannian Geometry)	50
M1003	Number Theory	50
M1091	Elective Course	50
M1092	Elective Course	50

Options available for Elective - I and Elective - II Courses*

Elective	Course ID	Name of the Courses	Page Number	Full Marks	Credit Point	Classes per week
I	MATH0903A1	Topology-II	23	50	4	4 hr
	MATH0903A2	Advanced Complex Analysis	24	50	4	4 hr
	MATH0903B1	Special Theory of Relativity	25	50	4	4 hr
	MATH0903B2	Qualitative Theory of Planar Vector Fields - I	26	50	4	4 hr
	MATH0903B3	Advanced Operations Research - I	27	50	4	4 hr
	MATH0903B4	Mathematical Biology - I	28	50	4	4 hr
	MATH0903B5	Advanced Numerical Analysis - I	29	50	4	4 hr
II	MATH1003A1	Operator Algebra	30	50	4	4 hr
	MATH1003A2	Geometry - II	31	50	4	4 hr
	MATH1003A3	Abstract Harmonic Analysis	32	50	4	4 hr
	MATH1003B1	General Theory of Relativity and Cosmology	33	50	4	4 hr
	MATH1003B2	Qualitative Theory of Planar Vector Fields - II	34	50	4	4 hr
	MATH1003B3	Advanced Operations Research - II	35	50	4	4 hr
	MATH1003B4	Mathematical Biology - II	36	50	4	4 hr
	MATH1003B5	Advanced Numerical Analysis - II	37	50	4	4 hr

***N.B. : In E - I and II, exactly *one* from 'MATH0903AX & MATH1003AY' and exactly *one* from 'MATH0903BX & MATH1003BY' will be offered.**

Course Structure

Options available for Project & Dissertation**

Topics for project and dissertation include, but are not limited to, the following:

Lie groups, Lie algebras, Representation Theory, Compact Quantum Groups and Quantum Symmetry, Qualitative Theory of Differential Equations, Dynamical Systems, Complex Dynamics, Ergodic Theory, Riemann Surfaces, Algebraic Graph Theory, Domination in Graphs, Mathematical Cryptography, Cyber Security and Mathematics, Data Science and Analysis with Python, Special Theory of Relativity, General Theory of Relativity, Astrophysics and Cosmology, Theoretical and Observational Cosmology, Mechanics.

Avishek Adhikari
19/09/2023

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