

5-Year Integrated M Sc – Mathematics (Admissions 2019, 2020, 2021)

Program Outcomes

- PO1 **Knowledge in Mathematical Science:** Understand the basic concepts, fundamental principles and the scientific theories related to mathematical sciences.
- PO2 **Abstract thinking:** Ability to absorb and understand the abstract concepts that lead to various advanced theories in mathematical sciences.
- PO3 **Modelling and solving:** Ability in modelling and solving problems by identifying and employing the appropriate existing theories and methods.
- PO4 **Advanced theories and methods:** Understand advanced theories and methods to design solutions for complex mathematical problems
- PO5 **Applications in Engineering and Sciences:** Understand the role of mathematical sciences and apply the same to solve the real life problems in various fields of study.
- PO6 **Modern software tool usage:** Acquire the skills in handling scientific tools towards solving problems and solution analysis.
- PO7 **Environment and sustainability:** Understand the significance of preserving the environment towards sustainable development.
- PO8 **Ethics:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality. Continue to enhance the knowledge and skills in mathematical sciences for constructive activities and demonstrate highest standards of professional ethics.
- PO9 **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- PO10 **Communication:** Develop various communication skills such as reading, listening, and speaking which will help in expressing ideas and views clearly and effectively.
- PO11 **Project management and Research:** Demonstrate knowledge, understand the scientific and management principles and apply these to one's own work, as a member/ leader in a team to manage projects and multidisciplinary research environments. Also use the research-based knowledge to analyse and solve advanced problems in mathematical sciences.
- PO12 **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Curriculum (2019-2021 admissions)

Course Code	Course Title	L T P	Cr	ES	Course Code	Course Title	L T P	Cr	ES
SEMESTER 1					SEMESTER 2				
18ENG101	Communicative English	2 0 2	3	A	18ENG121	Professional Communication	1 0 2	2	A
	Language Paper I	1 0 2	2	B		Language Paper II	1 0 2	2	B
18MAT101	Calculus	3 1 0	4	G	18MAT122	Real Analysis	3 1 0	4	G
18MAT103	Discrete Structures	3 1 0	4	F	18MAT111	Groups and Rings	3 1 0	4	F
18CSA100	Problem Solving and Computer Programming	3 0 0	3	C	18CSA116	Advanced Computer Programming	3 0 0	3	D
18PHY101/ 18COM104	Physics / Introduction to Management and Finance	3 0 0	3	D	18CHY113/ 18COM116	Chemistry / Basics of Accountancy	3 0 0	3	C
18CSA180	Problem Solving and Computer Programming Lab.	0 0 2	1	L1	18CSA181	Advanced Computer Programming Lab.	0 0 2	1	L1
18PHY181/ 18CSA186	Physics / PC Software Lab.	0 0 2	1	L2	18CHY181/ 18COM181	Chemistry Lab. / Accounting Lab.	0 0 2	1	L2
18CUL101	Cultural Education I	2 0 0	2	E	18CUL111	Cultural Education II	2 0 0	2	E
	TOTAL		23			TOTAL		22	
SEMESTER 3					SEMESTER 4				
18MAT203	Rings, Vector Spaces and Fields	3 1 0	4	A	18MAT212	Linear Algebra	3 1 0	4	A
18MAT204	Real Analysis in Higher Dimension	3 1 0	4	B	18MAT202	Probability and Statistics	3 1 0	4	B
18MAT115	Vector Calculus	3 1 0	4	J	18MAT221	Numerical Methods	2 1 0	3	C
18MAT201	Differential Equations	3 1 0	4	H	18MAT214	Fourier Series and Integral Transforms	3 1 0	4	D
18MAT206	Statics	2 1 0	3	E	18MAT215	Dynamics	2 1 0	3	E
18ENV300	Environmental Science and Sustainability	3 0 0	3	D		Open Elective A*	3 0 0	3	J
18SSK201	Life Skills I	1 0 2	2	G	18MAT281	Numerical Methods Lab (MAT Lab)	0 0 2	1	L1
18AVP201	Amrita Values Programme I	1 0 0	1	F	18SSK211	Life Skills II	1 0 2	2	G
					18AVP211	Amrita Values Programme II	1 0 0	1	F
	TOTAL		25			TOTAL		25	
SEMESTER 5					SEMESTER 6				
18MAT306	Operations Research	3 1 0	4	A	18MAT311	Optimization Theory	3 1 0	4	A
18MAT307	Applied Statistics	3 1 0	4	B	18MAT312	Topology	3 1 0	4	B
18MAT302	Basic Graph Theory and Combinatorics	2 1 0	3	C	18MAT313	Special Functions	3 1 0	4	C
18MAT303	Complex Analysis	3 1 0	4	D	18MAT213	Formal Languages and Automata Theory	3 1 0	4	D
18MAT308	Number Theory	3 1 0	4	E	18MAT314	Calculus of Variations	3 1 0	4	E
18MAT381	Statistics Lab	0 0 2	1	L1	18MAT391	Seminar			P/F
18MAT390	Live-in-Lab. [®] / Open Elective B*	3 0 0	3	J		TOTAL		20	
18SSK301	Life Skills III	1 0 2	2	G	18MAT399	Project (for Exit-option)		6	P
						TOTAL		26	
	TOTAL		25			TOTAL (for Exit-option students)		146	
SEMESTER 7					SEMESTER 8				
22MAT501	Advanced Algebra	3 1 0	4	A	22MAT511	Advanced Complex Analysis	3 1 0	4	A
22MAT502	Advanced Real Analysis	3 1 0	4	B	22MAT512	Advanced Topology	3 1 0	4	A
22MAT503	Ordinary Differential Equations	3 0 2	4	C	22MAT513	Partial Differential Equations	3 0 2	4	B
22MAT504	Functional Analysis-I	3 1 0	4	C	22MAT514	Measure Theory	4 0 0	4	C
22MAT581	Mathematics Lab	0 0 2	1	L1		Elective I	3 0 0	3	E
22MAT505	Data Structures and Algorithms	3 0 2	4	E		Elective II	3 0 0	3	L
	TOTAL		21			TOTAL		22	
SEMESTER 9					SEMESTER 10				
22MAT601	Advanced Graph Theory	3 0 2	4	A		Elective VI	3 0 0	3	E
22MAT602	Functional Analysis-II	3 1 0	4	B	22MAT699	Dissertation		10	P
22MAT603	Mathematical Foundations of Incompressible Fluid Flow	3 1 0	4	C					
	Elective III	3 0 0	3	D					
	Elective IV	3 0 0	3	E		TOTAL		13	
	Elective V	3 0 0	3	F					
22MAT690	Seminar	0 0 2	1	G					
	TOTAL		22			TOTAL	218		

ELECTIVES (any one Stream)

ALGEBRA STREAM										ANALYSIS STREAM														
22MAT631	Algebraic Geometry	3 0 0	3	D/E		22MAT641	Fixed Point Theory	3 0 0	3	D/E		22MAT632	Algebraic Topology	3 0 0	3	D/E		22MAT642	Fractals	3 0 0	3	D/E		
22MAT633	Commutative Algebra	3 0 0	3	D/E		22MAT643	Harmonic Analysis	3 0 0	3	D/E		22MAT634	Finite Field	3 0 0	3	D/E		22MAT644	Nonlinear Partial	3 0 0	3	D/E		
22MAT635	Information and Coding Theory	3 0 0	3	D/E		22MAT645	Wavelet Analysis	3 0 0	3	D/E		22MAT636	Lie Algebra	3 0 0	3	D/E		22MAT646	Mathematical Physics	3 0 0	3	D/E		
22MAT637	Linear Algebra (for M.Sc	3 0 0	3	D/E		22MAT647	Operator Theory	3 0 0	3	D/E		22MAT638	Representation Theory	3 0 0	3	D/E		22MAT648	Fourier transform and Distribution Theory	3 0 0	3	D/E		
22MAT639	Semi group Theory	3 0 0	3	D/E								22MAT640	Theory of Manifolds	3 0 0	3	D/E								
												STATISTICS STREAM					DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS STREAM							
22MAT671	Queuing Theory and Inventory Control Theory	3 0 0	3	D/E		22MAT651	Advance Boundary Layer Theory	3 0 0	3	D/E		22MAT672	Statistical Pattern Classifications	3 0 0	3	D/E		22MAT652	Computational Fluid Dynamics	3 0 0	3	D/E		
22MAT673	Statistical Quality Control and Six Sigma Quality Analysis	3 0 0	3	D/E		22MAT653	Finite Element Method	3 0 0	3	D/E		22MAT674	Theory of Sampling and Design of Experiments	3 0 0	3	D/E		22MAT654	Magneto-Hydro Dynamics	3 0 0	3	D/E		
22MAT675	Time Series Analysis	3 0 0	3	D/E		22MAT655	Advanced Numerical Analysis	3 0 0	3	D/E		22MAT676	Statistical Techniques For Data Analytics	3 0 0	3	D/E		22MAT656	Hemodynamics	3 0 0	3	D/E		
22MAT677	Mathematical Finance	3 0 0	3	D/E		22MAT657	Stochastic Differential Equations	3 0 0	3	D/E							22MAT658	Singular Perturbation Theory	3 0 0	3	D/E			
						22MAT659	Nonlinear Dynamics and Chaos	3 0 0	3	D/E														
												COMPUTER STREAM												
22MAT660	Machine Learning	3 0 0	3	D/E								22MAT661	Algorithms For Advanced Computing	3 0 0	3	D/E								
22MAT662	Computer Aided Design for VLSI circuits	3 0 0	3	D/E								22MAT663	Cryptography	3 0 0	3	D/E								
22MAT664	Fuzzy Sets and its Applications	3 0 0	3	D/E								22MAT665	Introduction to Soft Computing	3 0 0	3	D/E								
22MAT666	Object-Oriented Programming and Python	3 0 0	3	D/E								22MAT667	Graph Analytics and Applications	3 0 0	3	D/E								
22MAT668	Social Network Analysis	3 0 0	3	D/E								22MAT669	Computer Aided Drug Design	3 0 0	3	D/E								
22MAT670	Evolutionary Game Dynamics	3 0 0	3	D/E																				

* **Two Open Elective** courses are to be taken by each student, one each at the **4th and the 5th** semesters, from the list of Open electives offered by the School.

® Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Open Elective course in the fifth semester