DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : **XXX M.Sc. (Mathematics)**
Department : **Department of Mathematics**
Year : **I**
Model : **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MAC-401	Abstract Algebra	PCC	4	3	1	0	3	0
2.	MAC-403	Linear Algebra	PCC	4	3	1	0	3	0
3.	MAC-405	Real Analysis	PCC	4	3	1	0	3	0
4.	MAC-501	Probability and Statistics	PCC	4	3	0	2	3	0
5.	MAC-503	Ordinary Differential Equations	PCC	4	3	1	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**22**					
Semester-II (Spring)									
1.	MAC-402	Topology	PPI	4	3	1	0	3	0
2.	MAC-404	Functional Analysis	PPI	4	3	1	0	3	0
3.	MAC-502	Complex Analysis	PPI	4	3	1	0	3	0
4.	MAC-504	Partial Differential Equations	PPI	4	3	1	0	3	0
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MAC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : **XXX M.Sc. (Mathematics)**
Department : **Department of Mathematics**
Year : **II**
Model : **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MAC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MAC-511	Numerical Analysis	PPI	4	3	0	2	3	0
3.	MAC-513	Operations Research	PPI	4	3	0	2	3	0
4.		Program Elective-I	PPI	3/4	-	-	-	-	-
5.		Program Elective-II	PPI	3/4	-	-	-	-	-
		Total		**17/19**					
Semester-II (Spring)									
1.		Program Elective-III	PEC	3/4	-	-	-	-	-
2.		Program Elective-IV	PEC	3/4	-	-	-	-	-
3.	MAC-601	Project	PROJECT	8	-	-	-	-	-
		Total		**14/16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	22	21	17/19	14/16
Total Credits	**74/78**			

M.Sc. (Mathematics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MAL-410	Computer Programming	PEC	4	3	1	0	3	0
2.	MAL-411	Analytic Number Theory	PEC	4	3	1	0	3	0
3.	MAL-412	Combinatorial Mathematics	PEC	4	3	1	0	3	0
4.	MAL-413	Credit Risk Modeling	PEC	4	3	1	0	3	0
5.	MAL-414	Differential Geometry	PEC	4	3	1	0	3	0
6.	MAL-416	Graph Theory	PEC	4	3	1	0	3	0
7.	MAL-417	Mathematical Image Processing	PEC	4	3	1	0	3	0
8.	MAL-418	Mathematical Modeling and Simulation	PEC	4	3	1	0	3	0
9.	MAL-419	Number Theory	PEC	4	3	1	0	3	0
10.	MAL-420	Statistical Machine Learning	PEC	4	3	1	0	3	0
11.	MAL-511	Abstract Harmonic Analysis	PEC	4	3	1	0	3	0
12.	MAL-512	Advanced Complex Analysis	PEC	4	3	1	0	3	0
13.	MAL-513	Advanced Matrix Theory	PEC	4	3	1	0	3	0
14.	MAL-514	Advanced Numerical Analysis	PEC	4	3	1	0	3	0
15.	MAL-515	Advanced Operations Research	PEC	4	3	1	0	3	0
16.	MAL-516	Advanced Partial Differential Equations	PEC	4	3	1	0	3	0
17.	MAL-517	Algebraic Number Theory	PEC	4	3	1	0	3	0
18.	MAL-518	Algebraic Topology	PEC	4	3	1	0	3	0
19.	MAL-519	Approximation Theory	PEC	4	3	1	0	3	0
20.	MAL-520	Coding Theory	PEC	4	3	1	0	3	0
21.	MAL-521	Commutative Algebra	PEC	4	3	1	0	3	0
22.	MAL-522	Computational Fluid Dynamics	PEC	4	3	1	0	3	0

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Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
23.	MAL-523	Control Theory	PEC	4	3	1	0	3	0
24.	MAL-524	Dynamical Systems	PEC	4	3	1	0	3	0
25.	MAL-525	Fluid Dynamics	PEC	4	3	1	0	3	0
26.	MAL-526	Fourier Analysis and Applications	PEC	4	3	1	0	3	0
27.	MAL-527	Fuzzy Sets and Fuzzy Systems	PEC	4	3	1	0	3	0
28.	MAL-528	Hyperbolic Conservation Laws	PEC	4	3	1	0	3	0
29.	MAL-529	Integral Equations and Calculus of Variations	PEC	4	3	1	0	3	0
30.	MAL-530	Finite Element Methods	PEC	4	3	1	0	3	0
31.	MAL-531	Mathematical Biology	PEC	4	3	1	0	3	0
32.	MAL-532	Mathematical Cryptography	PEC	4	3	1	0	3	0
33.	MAL-533	Measure Theory	PEC	4	3	1	0	3	0
34.	MAL-534	Multivariate Techniques	PEC	4	3	1	0	3	0
35.	MAL-535	Numerical Linear Algebra	PEC	4	3	1	0	3	0
36.	MAL-536	Operator Theory	PEC	4	3	1	0	3	0
37.	MAL-537	Optimal Control Theory	PEC	4	3	1	0	3	0
38.	MAL-538	Orthogonal Polynomials and Special Functions	PEC	4	3	1	0	3	0
39.	MAL-539	Portfolio Optimization	PEC	4	3	1	0	3	0
40.	MAL-540	Regularization Theory for Inverse Problems	PEC	4	3	1	0	3	0
41.	MAL-541	Representation Theory of Finite Groups	PEC	4	3	1	0	3	0
42.	MAL-542	Semigroup Theory and Applications	PEC	4	3	1	0	3	0
43.	MAL-543	Sobolev Spaces and Applications	PEC	4	3	1	0	3	0
44.	MAL-544	Statistical Inference	PEC	4	3	1	0	3	0

M.Sc. (Mathematics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
45.	MAL-545	Stochastic Differential Equations	PEC	4	3	1	0	3	0
46.	MAL-546	Stochastic Partial Differential Equations	PEC	4	3	1	0	3	0
47.	MAL-547	Stochastic Calculus	PEC	4	3	1	0	3	0
48.	MAL-549	Financial Mathematics	PEC	4	3	1	0	3	0
49.	MAL-550	Financial Risk Management	PEC	4	3	1	0	3	0
50.	MAL-551	Numerical Optimization	PEC	4	3	1	0	3	0
51.	MAL-552	Probability Theory	PEC	3	3	0	0	3	0
52.	MAL-553	Ergodic Theory	PEC	3	3	0	0	3	0
53.	MAL-554	Introduction to Operator Algebra	PEC	3	3	0	0	3	0
54.	MAL-555	Parallel Computing	PEC	4	3	1	0	3	0
55.	MAL-556	Soft Computing	PEC	4	3	1	0	3	0
56.	MAL-557	Evolutionary Algorithms	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	MAT-501	Computational Methods for AI and ML	STAR	3	2	1	0	3	0