



**INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036**

**Curriculum for
M.Sc. Degree Programme
2019 Batch**



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Sl.No.	Details	Page No.
1	Credit Requirement	2
2	Chemistry	4
3	Mathematics	6
4	Physics	10



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MINIMUM CREDIT REQUIREMENTS

Sl.No.	Details	Credit
1	Chemistry	202
2	Mathematics	204
3	Physics	215

Branch Code: CY

M.Sc. Chemistry 2019 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	CY5011	Transition Metal and Bioorganic Chemistry	3	0	0	0	6	9
2	CY5013	Conceptual Organic Chemistry	3	0	0	0	6	9
3	CY5015	Classical and Statistical Thermodynamics	3	0	0	0	6	9
4	CY5017	Principles of Quantum Mechanics	3	1	0	0	9	10
5	CY5019	Organometallic Chemistry	3	0	0	0	6	9
6	CY5021	Computational Chemistry Lab	0	0	0	3	0	3
7	CY5023	Organic Chemistry Lab	0	0	0	3	0	3
Total Credits :								52

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	CY5012	Main Group Chemistry and Spectroscopic Characterization of Inorganic Compounds	3	0	0	0	6	9
2	CY5014	Reactive Intermediates and Concerted Reactions	3	0	0	0	6	9
3	CY5016	Kinetics and Reaction Dynamics	3	0	0	0	6	9
4	CY5018	Chemical Bonding and Group Theory	3	0	0	0	6	9
5	CY5020	Analytical Chemistry: Principles, Practices and Applications	3	0	0	0	6	9
6	CY5022	Inorganic Chemistry Laboratory	0	0	0	3	0	3
7	CY5024	Physical Chemistry Laboratory	0	0	0	3	0	3
Total Credits :								51

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	CY6011	Solid State Chemistry	3	0	0	0	6	9
2	CY6013	Spectroscopic Applications in Organic Chemistry	3	0	0	0	6	9
3	CY6015	Electrochemistry: Fundamentals and Applications	3	0	0	0	6	9
4	CY6017	Optical and Magnetic Resonance Spectroscopy	3	0	0	0	6	9
5	CY6019 or CY6023	Modern Synthetic Methods in Organic Chemistry Or New Methods and Strategies in Organic Synthesis	3	0	0	0	6	9
6	CY6025	Project - I	0	0	0	0	9	9
Total Credits :								54

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	DPE1	Department Elective 1	3	0	0	0	6	9
2	DPE2	Department Elective 2	3	0	0	0	6	9
3	DPE3	Department Elective 3	3	0	0	0	6	9
4	CY6026	Project - II	0	0	0	0	18	18
	Or	Or						or
	DPE4	Department Elective 4 #	3	0	0	0	6	9
	DPE5	Department Elective 5 #	3	0	0	0	6	9
	DPE6	Department Elective 6 #	3	0	0	0	6	9
		Total Credits :						45/54

Semester	I	II	III	IV	Total
Credits	52	51	54	45	202

Total Credits for the Program: 202; Electives: 31%

Branch Code: MA

M.Sc. Mathematics 2019 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA5320	Algebra I	3	0	0	0	6	9
2	MA5310	Linear Algebra	3	0	0	0	6	9
3	MA5330	Real Analysis	3	0	0	0	6	9
4	MA5370	Multivariable Calculus	3	0	0	0	6	9
5	MA5390	Ordinary Differential Equations	3	0	0	0	6	9
6	MA5400	Probability Theory	3	0	0	0	6	9
		Total Credits :						54

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA5340	Measure and Integration	3	0	0	0	6	9
2	MA5360	Complex Analysis	3	0	0	0	6	9
3	MA5380	Topology	3	0	0	0	6	9
4	MA5920	Partial Differential Equations	3	0	0	0	6	9
5	MA5350	Combinatorics	3	0	0	0	6	9
6	MA5470	Numerical Analysis	3	0	0	0	6	9
		Total Credits :						54

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	MA5450	Functional Analyses	3	0	0	0	6	9
2	DPE1	Department Elective 1	3	0	0	0	6	9
3	DPE2	Department Elective 2	3	0	0	0	6	9
4	DPE3	Department Elective 3	3	0	0	0	6	9
5	DPE4	Department Elective 4	3	0	0	0	6	9
6	MA5260/ MA5261	Seminar / Programming Lab					6	6
		Total Credits :						51

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	DPE5	Department Elective 5	3	0	0	0	6	9
2	DPE6	Department Elective 6	3	0	0	0	6	9
3	DPE7	Department Elective 7	3	0	0	0	6	9
4	DPE8	Department Elective 8	3	0	0	0	6	9
5	DPE9	Department Elective 9 or Project **	3	0	0	0	6	9
		Total Credits :						45

** Students have the option to take either project or Department Elective 9

Semester	I	II	III	IV	Total
Credits	54	54	51	45	204

DEPARTMENT OF MATHEMATICS
List of M.Sc. Electives (Existing)

Sl. No.	Course No.	COURSE NAME	Credit
1.	MA 5013	APPLIED REGRESSION ANALYSIS	9
2.	MA 5014	APPLIED STOCHASTIC PROCESSES	9
3.	MA 5311	LINEAR SYSTEMS THEORY	9
4.	MA 5312	STOCHASTIC DIFFERENTIAL EQUATIONS	9
5.	MA 5313	INTRODUCTION TO MATHEMATICAL STATISTICS	9
6.	MA 5430	ALGEBRA II: RING THEORY AND FIELD THEORY	9
7.	MA 5460	TRANSFORM TECHNIQUES	9
8.	MA 5490	FLUID DYNAMICS	9
9.	MA 5950	MATHEMATICAL FINANCE	9
10.	MA5016	ERGODIC THEORY COURSE CONTENT:	9
11.	MA5017	REPRESENTATION THEORY	9
12.	MA5140	INTRODUCTION TO ALGEBRAIC TOPOLOGY	9
13.	MA5220	CONTINUUM MECHANICS	9
14.	MA5314	DIFFERENTIAL GEOMETRY OF MANIFOLDS	9
15.	MA5315	DIFFERENTIAL TOPOLOGY	9
16.	MA5440	COMBINATORICS AND NUMBER THEORY	9
17.	MA5750	APPLIED STATISTICS	9
18.	MA5850	OPERATIONS RESEARCH	9
19.	MA5890	NUMERICAL LINEAR ALGEBRA	9
20.	MA6001	INTRODUCTION TO CODING THEORY	9

Sl. No.	Course No.	COURSE NAME	Credit
21.	MA6002	APPROXIMATION THEORY	9
22.	MA6003	THEORY OF WAVELETS	9
23.	MA6004	FRACTALS	9
24.	MA6005	APPLIED LINEAR ALGEBRA	9
25.	MA6006	APPLIED INTEGRAL EQUATIONS	9
26.	MA6007	NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS	9
27.	MA6050	DYNAMICAL SYSTEMS	9
28.	MA6060	NONLINEAR CONSERVATION LAWS	9
29.	MA6080	FOURIER ANALYSIS	9
30.	MA6090	SOBOLEV SPACES AND APPLICATIONS TO PDE	9
31.	MA6110	TOPICS IN ADVANCED ANALYSIS	9
32.	MA6120	ADVANCED COMPLEX ANALYSIS	9
33.	MA6140	FIXED POINT THEORY AND APPLICATIONS	9
34.	MA6150	BASIC OPERATOR THEORY	9
35.	MA6180	INTRODUCTION TO ALGEBRAIC GEOMETRY	9
36.	MA6190	MATHEMATICAL LOGIC	9
37.	MA6200	THEORY OF COMPUTATION	9
38.	MA6210	COMBINATORIAL OPTIMIZATION	9
39.	MA6230	GRAPH THEORY	9
40.	MA6270	NUMERICAL SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS	9
41.	MA6312	MATHEMATICAL THEORY OF GAMES	9
42.	MA6360	OPTIMIZATION TECHNIQUES	9

Sl. No.	Course No.	COURSE NAME	Credit
43.	MA6420	ALGEBRAIC THEORY OF CODES AND AUTOMATA	9
44.	MA6460	COMPUTATIONAL FLUID DYNAMICS	9
45.	MA6470	COMMUTATIVE ALGEBRA	9
46.	MA6480	GALOIS THEORY	9
47.	MA6490	INTRODUCTION TO ALGEBRAIC NUMBER THEORY	9
48.	MA7015	INTRODUCTION TO CRYPTOLOGY	9
49.	MA7654	ALGEBRAIC COMBINATORICS	9

Branch Code: PH

M.Sc. Physics

2019 Batch

Semester 1

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5010	Mathematical Physics I	3	1	0	0	6	10
2	PH5030	Classical Mechanics	3	1	0	0	6	10
3	PH5100	Quantum Mechanics I	3	1	0	0	6	10
4	PH5040	Electronics	3	0	0	0	6	9
5	PH5060	Physics Lab. I (PG)	0	0	0	9	3	12
Total Credits :								51

Semester 2

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH5020	Electromagnetic Theory	3	1	0	0	6	10
2	PH5080	Statistical Physics	3	0	0	0	6	9
3	PH5170	Quantum Mechanics II	3	0	0	0	6	9
4	PH5160	Condensed Matter Physics I	3	1	0	0	6	10
5	PH5250 (or) PH5720	Advanced Electronics & Lab (or) Numerical Methods and Programming Lab	3	0	0	3	6+0	12
6	PH5120	Physics Lab. II (PG)	0	0	0	9	3	12
Total Credits :								62

Semester 3

S.No	Course No	Course Name	L	T	E	P	O	C
1	PH 5410	Atomic and Molecular Physics	3	1	0	0	6	10
2	PH5110 (or) PH5050	Optics and Photonics (or) Mathematical Physics II	3	0	0	0	6	9
3	PH5210 (or) PH5211	Condensed Matter Physics II (or) High Energy Physics	3	0	0	0	6	9
4	DPE1	Elective - I	3	0	0	0	6	9
5	PH5270	Physics Lab. III (PG)	1	0	0	6	2+2	11
6	PH5291 (or) DPE4	Project I (or) Elective IV	0	0	0	0	9	9
Total Credits :								57

* Project (PH5290*) Grades will be awarded at the end of 4th semester

Semester 4

S.No	Course No	Course Name	L	T	E	P	O	C
1	DPE2	Elective - II	3	0	0	0	6	9
2	DPE3	Elective -III	3	0	0	0	6	9
3	PH5230	Seminar	0	0	0	0	3	3
4	PH5240	Viva voce	0	0	0	0	6	6
5	PH5300 (or) DPE5 & DPE6	Project II (or) Elective V and Elective VI	0	0	0	0	18	18
Total Credits :								45

Instead of PH5291 (Project I) in Semester 3 and PH5300 (Project II) in Semester 4, the students have the option to take Department Elective IV in Semester 3 and Department Electives V & VI in Semester 4.

Semester	I	II	III	IV	Total
Credits	51	62	57	45	215