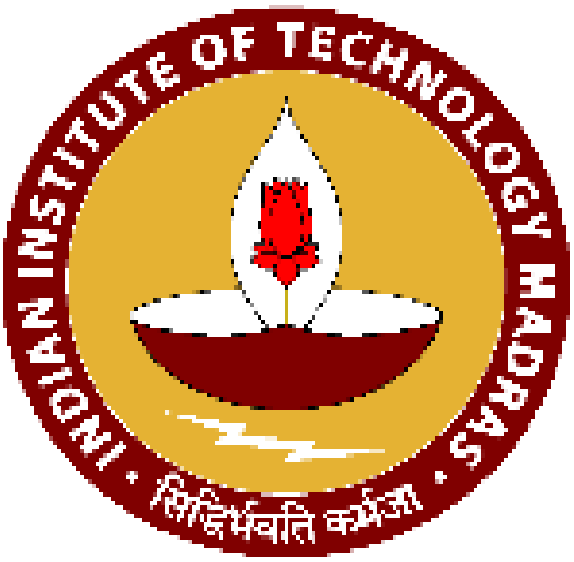

INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036

Curriculum for
M.Sc. Degree Programme
2020 Batch

INDIAN INSTITUTE OF TECHNOLOGY MADRAS

Curriculum for M.Sc. Degree Programme

2020 Batch

M.Sc. Degree Programme
2020 Batch

MINIMUM CREDIT REQUIREMENTS

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

Branch Code: CY

M.Sc. Chemistry

2020 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
2020 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	APPROMIMATION 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
2020 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