DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : XX BS-MS (Chemical Sciences)
Department : CY CHEMISTRY
Year : I

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Subject Code	Courses Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester-I (Autumn)														
1.	MA-001	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	CY-101	Introduction to Chemical Science	PCC	2	2	0	0	0	0	20-35	-	20-30	40-50	-
3.	CY-103	Computer Programming	ESC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
4.	PH-007	Modern Physics	BSC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5.	HSN-002	Introduction to Psychology	HSSC	2	1	1	0	2	0	20-35	-	20-30	40-50	-
6.	CEN-105	Introduction to Environmental Studies	GSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7.	HSN-001A	Communication Skills (Basic)	HSSC	2	1	0	2	2	0	20-35	-	20-30	40-50	-
	HSN-001 B	Communication Skills (Advanced)												
		Total		**21**										
Semester-II (Spring)														
1.	MA-004	Numerical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	PH-008	Electromagnetic theory	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CY-102	Physical Chemistry-I	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
4.	CY-104	Organic and Inorganic Chemistry	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
5.	CY-106	Basic Analytical Chemistry	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6.	CHN-102	Energy Engineering	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		**23**										

Program Code: **XX BS-MS (Chemical Sciences)**
Department: **CY Chemistry**
Year: **II**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	**Sub Code**	**Courses Title**	**Sub. Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**	**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
Semester-III (Autumn)														
1.	BT-201	Genetics and Developmental Biology	ESC	4	3	0	2	3	0	10-25	25	15-25	30-40	0
2.	CY-201	Chemical Thermodynamics	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	CY-203	Main Group and Cluster Chemistry	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
4.	CY-205	Organic Chemistry-I	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	MA-209	Ordinary and Partial Differential Equations	BSC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
6.	HSS-ELE	HSS Elective Course	HSSMEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
		Total		**23**										
Semester-IV (Spring)														
1.	CY-202	Coordination Chemistry and Organometallics	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	CY-204	Organic Chemistry-II	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	CY-206	Chemical Kinetics	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-208	Polymer Chemistry	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	CY-212	Laboratory-I	PCC	6	0	0	12	0	4	0	25-35	20-30	0	40-50
6.	CY-ELE1	Program Elective-1	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
		Total		**24**										

Program Code: **XX BS-MS (Chemical Sciences)**
Department: **CY Chemistry**
Year: **III**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	**Sub Code**	**Courses Title**	**Sub. Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**	**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
Semester-V (Autumn)														
1.	CY-301	Quantum Chemistry and Chemical Bonding	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	CY-303	Advanced Coordination Chemistry	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	CY-305	Organic Chemistry-III	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-311	Organic Chemistry Laboratory	PCC	4	0	0	8	0	4	0	25-35	20-30	0	40-50
5.	OEC-1	Open Elective Course-1	OEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CY-ELE2	Program Elective-2	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
		Total		**21**										
Semester-VI (Spring)														
1.	CY-302	Group Theory and Spectroscopy	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	CY-304	Solid State Chemistry and Applications	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-306	Organic Chemistry-IV	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-312	Inorganic Chemistry Laboratory	PCC	4	0	0	8	0	4	0	25-35	20-30	0	40-50
5.	CY-316	Art of Scientific/ Technical Writing	PCC	2	2	0	0	2	0	20-35	0	20-30	40-50	0
6.	CY-398	Educational Tour	PCC	0	0	0	0	0	0	0	0	0	0	0
7.	BM-ELE	Management Studies Elective Course	HSSMEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
8.	MSC-1	Minor Specialization Course-I	MSC	3/4	3	0/1	0	3	0	20-35	0	20-30	40-50	0
		Total		**19-23**										

Program Code: **XX BS-MS (Chemical Sciences)**
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Year: **IV**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Courses Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester-VII (Autumn)														
1.	CY-521	Advanced Analytical Methods	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CY-523	Organic Chemistry-V	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-525	Advanced Molecular Spectroscopy	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-531	Physical Chemistry Laboratory	PCC	4	0	0	8	0	4	0	25-35	20-30	0	40-50
5	CY-ELE3	Program Elective-3	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	MSC-2	Minor Specialization Course-II	MSC	3/4	3	0/1	0	0	0	20-35	0	20-30	40-50	0
7.	MSC-3	Minor Specialization Course-III	MSC	3/4	3	0/1	0	0	0	20-35	0	20-30	40-50	0
		Total		**16-24**										
Semester-VIII (Spring)														
1.	CY-522	Materials Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CY-524	Frontier Inorganic Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-526	Organic Chemistry-VI	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-ELE4	Program Elective-4 Project*	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
6.	CY-ELE5	Program Elective-5 CY-500	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
7.	MSC-4	Minor Specialization Course-IV	MSC	3/4	3	0/1	0	3	0	20-35	0	20-30	40-50	0
7.	MSC-5	Minor Specialization Course-V	MSC	3/4	3	0/1	0	3	0	20-35	0	20-30	40-50	0
		Total		**17-25**										

Note: Students wishing to have BS Degree in Chemical Sciences they must inform to Dean (Academic Affairs) about their option before completing 7th semester and they may exit the program at the end of 4th year.

*Compulsory for BS Degree students

Program Code: **XX BS-MS (Chemical Sciences)**
Department: **CY Chemistry**
Year: **V**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Courses Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester-IX (Autumn)														
1.	CY-600A	Thesis Stage I	THE	4	0	0	8	0	0	0	0	0	100	0
2.	CY-ELE6	Program Elective-6	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-ELE7	Program Elective-7	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-ELE8	Program Elective-8	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-699	Seminar	PCC	2	0	0	0	0	0	0	0	0	100	0
		Total		**15**										
Semester-X (Spring)														
1.	CY-600B	Thesis Stage II	THE	12	0	0	24	0	0	0	0	0	100	0
		Total		**12**										

List of Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Courses Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	CY-210	Bioinorganic and Biomimetic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CY-309	Chemistry of Industrial Processes	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-512	Nuclear and Radiochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-514	Heterocyclic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-518	Structure, Bonding and Properties of Solids	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CY-606	Total Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
7.	CY-607	Electroanalytical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
8.	CY-608	Chemical Biology	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
9.	CY-609	Inorganic Biochemistry and Reaction Mechanism	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
10.	CY-610	Molecular Modeling and Simulations	PEC	3	2	0	2/2	2	0	15-30	20	15-25	30-40	0
11.	CY-612	Carbon Nanomaterials and their Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
12.	CY-613	Frontiers in Inorganic Biochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
13.	CY-614	Asymmetric Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
14.	CY-615	Crystal and Molecular Structure	PEC	3	2	0	2/2	2	0	15-30	20	15-25	30-40	0
15.	CY-617	Supramolecular Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
16.	CY-619	Modern Organic Synthetic Methods	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
17.	CY-621	Organic Structure Determination	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
18.	CY-623	Organic Semiconductors	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
19.	CY-625	Proteins and Polypeptides	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
20.	CY-627	Advanced Surface and Colloidal Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
21.	CY-633	Nanoscale Materials: Properties and Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0

22.	CY-635	Advanced Magnetic Resonance Spectroscopy	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
23.	CY-638	Reactivity, Structure Determination, Devices and Electronic Structure of Solids	PEC	3	2	0	2	3	0	20-35	0	20-30	40-50	0
24.	CY-703	Advanced Material Characterization Techniques	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
25.	CY-902	Advanced Inorganic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
26.	CY-903	Advanced Organic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
27.	CY-904	Advanced Physical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
28.	CY-905	Spectroscopic Methods of Structural Elucidation	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0