Curriculum for B.Sc (Honours with Research) in Chemistry with Minors in 'Nanotechnology' and 'Scientific Programming / Polymer Science' * (NEP – 2020 aligned)

Abbreviations:

DSC: Discipline Specific Core (Major / Minor) **MDC**: Multidisciplinary Course **SEC**: Skill Enhancement Course

DSE: Discipline Specific Elective **AEC**: Ability Enhancement Course **VAC**: Value-Added Course

FLB: Field Based Learning

Semester I				Semester II			
Course code	**Course Title**	**L T P**	**Credit**	**Course code**	**Course Title**	**L T P**	**Credit**
	DSC (Major) - Atomic Structure, Chemical Bonding and Analytical Chemistry	3 1 0	4		**DSC (Major)** - Nuclear Chemistry and States of Matter	3 1 0	4
	DSC (Major) - Volumetric Analysis Laboratory	0 0 2	1		**DSC (Major)** - Properties of solutions and inorganic qualitative analysis lab	0 0 2	2
	DSC (Major) - Introductory Mechanics for Chemistry	3 1 0	4		**DSC (Major)** - Electricity and Magnetism	3 1 0	4
	DSC (Major) - Introductory Mechanics for Chemistry – Lab	0 0 2	1		**DSC (Major)** - Electricity and Magnetism - Lab	0 0 2	1
	MDC - Introduction to Calculus and Matrix Theory	3 0 0	3		**MDC** - Ordinary Differential Equations and Vector Calculus	3 0 0	3
	AEC - Language I	1 0 2	2		**AEC** - Language II	1 0 2	2
	AEC - English for Scientific Communication I	1 0 2	2		**AEC** - English for Scientific Communication II	1 0 2	2
	VAC - Sustainable Development and Living	2 0 0	2		**SEC** - Fundamentals of Programming	2 0 0	2
	VAC - Cultural Education	2 0 0	2		**SEC** - Fundamentals of Programming - Lab	0 0 2	1
	VAC - Mastery over Mind (MAOM)	1 0 2	2		**VAC** - Cultural Education	2 0 0	2
	Total		**23**		**Total**		**23**
Exit after first year: Award of 'Under Graduate Certificate' after bridge course (according to NHEQF Norms)							

Semester III				Semester IV			
Course code	**Course Title**	**L T P**	**Credit**	**Course code**	**Course Title**	**L T P**	**Credit**
	DSC (Major) - Basic Principles of Organic Chemistry	3 0 1	4		**DSC (Major)** - Thermodynamics and Chemical Equilibria	3 1 0	4
	DSC (Major) - Heat, Wave and Thermodynamics	3 0 1	4		**DSC (Major)** - Physical Chemistry Laboratory	0 1 2	2
	DSC (Major) - Principles in Inorganic Chemistry	3 1 0	4		**DSC (Major)** - Chemistry of Coordination Compounds	3 1 0	4
	DSE (Major) - Elective A	3 0 0	3		**DSC (Major)** - Fundamentals of Photochemistry and Pericyclic Reactions	3 1 0	4
	DSE (Major) - Elective B	3 0 0	3		**DSC (Minor I)** - Fundamentals of Nanoscience	3 0 0	3
	MDC - Complex Analysis, Probability and Statistical Methods	2 1 0	3		**DSC (Minor I)** - Materials Analysis Laboratory	0 0 2	1
	SEC - Life Skills I	1 0 2	2		**DSC (Minor II)***	3 0 1	4
	VAC - Constitution of India	1 0 0	1		**SEC** - Life Skills II	1 0 2	2
	VAC - Amrita Value Program I		P/F		**VAC** - Amrita Value Program II		P/F
	Total		**24**		**Total**		**24**
Exit after second year: Award of 'Under Graduate Diploma' after bridge course (according to NHEQF Norms)							
Semester V				**Semester VI**			
Course code	**Course Title**	**L T P**	**Credit**	**Course code**	**Course Title**	**L T P**	**Credit**
	DSC (Major) – Heterocyclic Compounds	3 0 1	4		**DSC (Major)** - Molecular Spectroscopy	3 1 0	4
	DSC (Major) - Inorganic Quantitative Analysis Lab	0 1 2	2		**DSE (Major)** - Elective C	3 0 0	3
	DSC (Major) - Chemical Kinetics and Surface Chemistry	3 1 0	4		**DSC (Minor I)** - Design and Characterization of Materials	2 0 1	3
	DSC (Minor I) - Advanced Materials	3 0 0	3		**DSC (Minor I)** - Nanoscience and Nanotechnology	3 0 0	3
	DSC (Minor II)*	2 1 0	3		**DSC (Minor I)** - Sustainable Materials	3 0 0	3
	DSC (Minor II)*	2 0 0	2		**DSC (Minor II)***	3 0 0	3
	DSC (Minor II)*	0 0 2	1		**DSC (Minor II)***	0 0 2	1
	FBL - Open Elective / Live in Lab	3 0 0	3		**DSC (Minor II)***	1 0 2	2
	SEC - Life Skills III	1 0 2	2				
	Total		**24**		**Total**		**22**

Exit after third year: Award of 'B.Sc in Chemistry with Minors in 'Nanotechnology' and 'Minor II*''							
Semester VII				**Semester VIII**			
Course code	**Course Title**	**L T P**	**Credit**	**Course code**	**Course Title**	**L T P**	**Credit**
	DSC (Major) - Organic Synthesis	3 0 0	3		**FBL** - Industrial Visit / Internship		P/F
	DSC (Major) - Quantum Chemistry	3 0 0	3		Dissertation		12
	DSC (Major) - Group Theory and its Applications	3 0 0	3				
	DSC (Major) - Research Methodology	3 0 0	3				
	DSC (Major) - Inorganic Semi-Micro qualitative analysis lab	0 0 5	2				
	DSC (Major) - Organic Quantitative Analysis Lab	0 0 5	2				
	Total		**16**		**Total**		**12**
Award of B.Sc (Honours with Research) in Chemistry with Minors in 'Nanotechnology' and 'Minor II*'							

Total number of credits: 168

*** Options for Minor II: (i) Scientific Programming (ii) Polymer Science**

List of courses in Minor II – Scientific Programming

Sl. No.	Course Code	Course Title	L T P	Credits	Semester
1		Numerical methods for modeling and simulations	3 0 1	4	IV
2		Fundamentals of Molecular Simulations	2 1 0	3	V
3		Foundations of Scientific Computing	2 0 0	2	V
4		Molecular Dynamics - Lab	0 0 2	1	V
5		Chemical Information Science	3 0 0	3	VI
6		Chemical Information Science - Lab	0 0 2	1	VI
7		Multiscale Modelling and Applications	1 0 2	2	VI
Total number of credits: 16					

List of courses in Minor II – Polymer Science

Sl. No.	Course Code	Course Title	L T P	Credits	Semester
1		Fundamentals of Polymer Science	3 0 1	4	IV
2		Polymeric Materials and their Properties	2 1 0	3	V
3		Functional Polymers	2 0 0	2	V
4		Polymer Science Lab - I	0 0 2	1	V
5		Bio and Bio-medical Polymers	3 0 0	3	VI
6		Polymer Science Lab - II	0 0 2	1	VI
7		Advances in Polymer Science and Technology	1 0 2	2	VI
Total number of credits: 16					

List of Electives (DSE)

Sl. No.	Course Title	L T P	Credits
1	Introduction to Food Chemistry	3 0 0	3
2	Forensic Sciences	3 0 0	3
3	Sustainable Chemical Sciences	3 0 0	3
4	Green Chemistry	3 0 0	3
5	Industrial Catalysis	3 0 0	3
6	Corrosion Science	3 0 0	3
7	Batteries and Fuel Cells	3 0 0	3
8	Industrial Metal Finishing Process	3 0 0	3