Updated Scheme

(Scheme PG A2: Postgraduate Programmes (Course work + Research)

Semester 1

Course Code	Course Title	Course ID	L (Hrs)	T (Hrs)	P (Hrs)	L Credits	T Credits	P Credits	Total Credits	MARKS TI	MARKS TE	MARKS PI	MARKS PE	MARKS Total
Core Course(s)														
CC-A01	Inorganic Chemistry - I	241/CHE/CC /101	3			3			3	25	50			75
					2			1	1			5	20	25
CC-A02	Physical Chemistry - I	241/CHE/CC /102	3			3			3	25	50			75
					2			1	1			5	20	25
CC-A03	Organic Chemistry - I	241/CHE/CC /103	3			3			3	25	50			75
					2			1	1			5	20	25
Discipline Specific Elective Courses														
DSE-01	Chemistry of Life Sciences	241/CHE/DS/ 101	3			3			3	25	50			75
	Mathematics for Chemist	241/CHE/DS/ 102												
	Applied Mathematics for Chemists	**241/CHE/DS /103**												
Multidisciplinary Course(s)														
MDC-01	From The Pool **Chemistry of Materials**	241/CHE/M D/101	3			3			3	25	50			75
Ability Enhancement Course(s)														
AEC-01	Environmental Chemistry – I	241/CHE/AE /101	2			2			2	15	35			50
Value-added Course(s)														
VAC-01	**Green Chemistry**	241/CHE/VA /101	2						2	15	35			50
Total Credits									**22**					

Semester 2

Course Code	Course Title	Course ID	L	T	P	L	T	P	Total Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
Core Course(s)														
CC-A04	Inorganic Chemistry - II	241/CHE/CC /201	3			3			3	25	50		-	75
					2			1	1			5	20	25
CC-A05	Physical Chemistry - II	241/CHE/CC /202	3			3			3	25	50			75
					2			1	1			5	20	25
CC-A06	Organic Chemistry - II	241/CHE/CC /203	3			3			3	25	50	-	-	75
					2			1	1			5	20	25
Discipline Specific Elective Courses														
DSE-02	From the Pool **Spectroscopic methods in Chemistry - I**	241/CHE/DS/ 201	3			3			3	25	50			75
Multidisciplinary Course(s)														
MDC-02	From The Pool **Drug Design and Discovery**	241/CHE/M D/201	3			3			3	25	50			75
Ability Enhancement Course(s)														
AEC-02	Computer for chemists	241/CHE/AE /201	2			2			2	15	35			50
Skill Enhancement Course(s)														
SEC-01	Analytical Chemistry	241/CHE/SE/ 201	2						2	15	35			50
Total Credits									22					

Semester 3

Course Code	Course Title	Course ID	L (Hrs)	T (Hrs)	P (Hrs)	L Credits	T Credits	P Credits	Total Credits	MARKS TI	MARKS TE	MARKS PI	MARKS PE	MARKS Total
Core Course(s)														
CC-A07	Inorganic Chemistry Special - I	241/CHE/ CC/301	3		2	3		1	4	25	50	5	20	100
	Physical Chemistry Special - I	241/CHE/ CC/311												
	Organic Chemistry Special - I	241/CHE/ CC/321												
CC-A08	Inorganic Chemistry Special - II	241/CHE/ CC/302	3		2	3		1	4	25	50	5	20	100
	Physical Chemistry Special - II	241/CHE/ CC/312												
	Organic Chemistry Special - II	241/CHE/ CC/322												
CC-A09	Inorganic Chemistry Special - III	241/CHE/ CC/303	3		2	3		1	4	25	50	5	20	100
	Physical Chemistry Special - III	241/CHE/ CC/313												
	Organic Chemistry Special - III	241/CHE/ CC/323												
Discipline Specific Elective Courses														
DSE-03	From the Pool **Spectroscopic methods in Chemistry - II**	241/CHE/ DS/301	3			3			3	25	50			75
Multidisciplinary Course(s)														
MDC-03	From The Pool **Instrumental methods of Analysis**	241/CHE/ MD/301	3			3			3	25	50			75
Skill Enhancement Course(s)														

SEC-02	Medicinal chemistry	241/CHE/SE/301	2			2			2	15	35			50
Value-added Course(s)															
VAC-02	Interdisciplinary Chemistry	241/CHE/VA/301	2			2			2	15	35			50
Seminar															
Seminar									2					50
Internship/Field Activity#															
									4						
Total Credits									28						

#Four credits of internship earned by a student during summer internship after 2nd semester will be counted in 3rd semester of a student who pursue 2 year PG Programme without taking exit option.

Semester 4

Course Code	Course Title	Course ID	L	T	P	L	T	P	Total Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
Ability Enhancement Course(s)														
AEC-03	Advanced Inorganic Chemistry	241/CHE/AE/401	2			2			2	15	35			50
	Advanced Physical Chemistry	241/CHE/AE/411												
	Advanced Organic Chemistry	241/CHE/AE/421												
Dissertation/Project Work														
Dissertation									20					
Total Credits									22					

Semester-1

Discipline Specific Elective (DSE) (to be effective from the session 2026-27)

Course Code DSE-01			Course Title Applied Mathematics for Chemists				Course ID 241/CHE/DS/103		
L	T	P	L	T	P	Total Credits	MARKS		
(Hrs)			Credits				TI	TE	Total
3	-	-	3	-	-	3	25	50	75
Examination Duration:							3 Hrs		

Course Objectives	• Develop mathematical skills required for understanding and solving chemical problems involving algebraic, graphical, statistical, and calculus-based methods. • Introduce vector and matrix algebra and their applications in molecular symmetry, quantum chemistry, and molecular orbital theory. • Familiarize students with statistical methods for the analysis, interpretation, and validation of experimental chemical data. • Provide knowledge of differential and integral calculus and differential equations for modelling chemical kinetics, thermodynamics, and transport phenomena. • Enable students to apply mathematical techniques to interpret experimental observations and solve quantitative problems encountered in chemistry.
Course Outcomes:	• Apply algebraic, logarithmic, and exponential functions to solve problems related to chemical equilibrium, reaction kinetics, pH calculations, and graphical interpretation of chemical data. • Utilize vector algebra, matrices, determinants, eigenvalues, and eigenvectors to analyze molecular structures, symmetry operations, and molecular orbital representations. • Perform statistical analysis of experimental data using measures of central tendency, dispersion, regression, correlation, least-squares fitting, and error analysis to evaluate the reliability of chemical measurements. • Apply differential and integral calculus, including partial differentiation, multiple integrals, Jacobians, and differential equations, to model and solve problems in chemical kinetics, thermodynamics, and transport processes. • Integrate mathematical and statistical tools to formulate, analyze, and interpret quantitative chemical problems encountered in advanced studies and research.

COURSE SYLLABUS

Note:

1. Question No. 1 is compulsory and shall contain short answer type questions covering the entire syllabus.
2. Eight questions will be set, two from each of the Units I, II, III and IV. Candidates are required to attempt four questions in all, selecting at least one question from each unit.
3. The question paper must be set in consonance with the course outcomes.

Unit No.	Contents	Contact Hrs
I	**Algebra, Logarithms and Graphical Methods**	11

	Algebraic expressions and identities, linear and quadratic equations, binomial expansion, logarithmic and exponential functions, laws of logarithms, relationship between logarithmic and exponential functions, applications in chemical equilibrium, kinetics and pH calculations. Cartesian coordinates, plotting of straight-line, parabolic, hyperbolic, logarithmic and exponential functions, straight-line equation, slope and intercept, graphical representation of experimental data.	
II	**Vectors and Matrices** Scalars and vectors, vector algebra, scalar and vector products, vector spaces, orthogonality and normalization. Matrices and determinants, matrix operations, inverse and transpose of matrices, eigenvalues and eigenvectors. Applications in molecular symmetry and molecular orbital theory.	**11**
III	**Data Analysis and Statistics** Mean, median, mode, variance, standard deviation, absolute and relative errors, significant figures, least-squares fitting, correlation and regression analysis, propagation of errors and uncertainty analysis. Applications in experimental data analysis and analytical chemistry.	**11**
IV	**Differential and Integral Calculus** Limits and continuity, differentiation of algebraic, logarithmic and exponential functions, partial differentiation, maxima and minima, exact and inexact differentials, indefinite and definite integration, multiple integrals, Jacobians, first- and second-order differential equations, applications to chemical kinetics, thermodynamics and transport phenomena.	**12**
Suggested Books	1. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill. 2. Mathematical Preparation for General Physics, J.B. Marian, R.C. Davidson Saunder Company. 3. Mathematics for Chemists – R. Gopalan. 4. Mathematical Preparation for Physical Chemistry – F. Daniels. 5. Mathematics for Physical Chemistry – Robert G. Mortimer. 6. Mathematical Methods for Science Students – G. Stephenson. 7. Fundamentals of Mathematical Statistics – S.C. Gupta and V.K. Kapoor. 8. Physical Chemistry – P.W. Atkins and Julio de Paula. 9. Advanced Engineering Mathematics-Erwin Kreyszig	
Theory	Internal Assessment: 25 Marks	• Class Participation: 05 Marks • Seminar/Presentation/ Assignment: 10 Marks • Mid Term Exam: 10 Marks
	External Assessment: 50 Marks (03 Hours)	• End Term Exam: 50 Marks