



SARDAR PATEL UNIVERSITY

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

Vallabh Vidyanagar

Gujarat

Academic Program Structure

&

Curriculum

(Aligned with NEP-2020)

M.Sc. Applied Chemistry

NHEQF Level: 6.5

Entry NHEQF Level	:	5.5/6
Duration	:	Two Years (Four Semesters)
Total Courses	:	24
Total Learning Hours	:	2640
Total Credits	:	88
Total Marks	:	2200

Graduate Attributes (GAs)

Upon Successful completion of the programme, graduates of M.Sc. Applied Chemistry are expected to attain the following Graduate Attributes:

GA1: Disciplinary Knowledge: Demonstrate comprehensive and applied knowledge of chemistry and its subfields.

GA2: Research Competence: Apply research principles, methods, and scientific inquiry.

GA3: Critical Thinking: Analyze, evaluate, and synthesize scientific data and arguments.

GA4: Problem Solving: Solve complex chemical problems in familiar and unfamiliar contexts.

GA5: Experimental Skills: Perform laboratory experiments using modern instruments and techniques.

GA6: Application Skills: Translate theoretical knowledge into real-life industrial and environmental solutions.

GA7: Communication Skills: Communicate scientific ideas effectively in written and oral forms.

GA8: Data Analysis: Interpret quantitative and qualitative data using statistical and computational tools.

GA9: Digital Literacy: Use ICT tools and modern chemical software/databases.

GA10: Ethics and Integrity: Follow research ethics, avoid plagiarism, and uphold professional integrity.

GA11: Environmental Awareness: Apply green chemistry and sustainable practices.

GA12: Teamwork and Leadership: Work collaboratively and lead scientific projects.

GA13: Lifelong Learning: Engage in self-directed and continuous learning.

GA14: Entrepreneurship Skills: Apply knowledge for innovation, startups, and industrial applications.

GA15: Social Responsibility: Contribute to society through responsible scientific practices.

Programme Educational Objectives (PEOs):

Within 3-5 years of completing M.Sc. Applied Chemistry program, graduate will be able to:

PEO1: Establish careers in chemical industries, research institutions, and academia.

PEO2: Apply advanced chemical knowledge and analytical skills to solve real-world problems.

PEO3: Pursue higher education (Ph.D.) and research innovation.

PEO4: Contribute to sustainable development and environmental protection.

PEO5: Demonstrate ethical practices, leadership, and teamwork in professional environments.

PEO6: Adapt to emerging technologies and interdisciplinary scientific challenges.

Program Learning Outcomes (PLOs):

Upon successful completion of the M.Sc. Applied Chemistry program, learner will be able to:

PLO1.

Demonstrate advanced knowledge and understanding of core areas of chemistry, including organic, inorganic, physical, analytical, and applied chemistry principles relevant to industrial and research applications.

PLO2.

Design, perform, and interpret laboratory experiments using modern chemical techniques, synthetic methodologies, and analytical instrumentation to solve complex chemical problems.

PLO3.

Apply chemical concepts, reaction mechanisms, and instrumental methods to develop, optimize, and evaluate chemical processes, materials, and products in academic, industrial, and environmental contexts.

PLO4.

Apply critical thinking and problem-solving skills to analyze scientific data and address complex challenges in professional and research environments.

PLO5.

Utilize appropriate statistical, computational, and information technology tools for data analysis, interpretation, and scientific reporting.

PLO6.

Plan and conduct independent research or project work systematically while maintaining scientific rigor and documentation standards.

PLO7.

Work effectively as an individual and as a member or leader in multidisciplinary teams to achieve common professional goals.

PLO8.

Communicate scientific concepts, research findings, and technical information clearly and effectively through oral, written, and digital formats to diverse audiences.

PLO9.

Demonstrate ethical responsibility, integrity, and professional conduct in scientific practice, research activities, and workplace environments.

PLO10.

Recognize the impact of chemistry on society, industry, health, safety, and the environment, and promote sustainable and responsible practices.

PLO11.

Adapt to emerging technologies, innovations, and evolving scientific knowledge through continuous learning and professional development.

PLO12.

Develop entrepreneurial mindset, leadership qualities, and decision-making skills for career advancement in academia, industry, or self-employment.



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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

M.Sc. Applied Chemistry

Semester-I

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2T01NCACH01	Transition Metal Chemistry and Organometallics	4-0-1	120	4	30	20	50	50	100
DSC	P2T01NCACH02	Organic Reactions and Stereochemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2T01NCACH03	Fundamentals of Physical Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2T01NCACH04	Quantitative and Qualitative Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2T01NCACH05	Physical and Analytical Instrumental Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2T01NCACH06	Spectroscopy	2-0-1	60	2	15	10	25	25	50
				660	22					550

DSC: Discipline Specific Core; **L:** Lecture; **P:** Practical; **T:** Tutorial; **FA:** Formative Assessment; **SA:** Summative Assessment



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Semester-II

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2T02NCACH01	Applied Inorganic and Quantum Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2T02NCACH02	Organic Reactions and Photochemical Processes	4-0-1	120	4	30	20	50	50	100
DSC	P2T02NCACH03	Advances in Physical Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2T02NCACH04	Ore-Alloy Analysis and Organic Synthesis Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2T02NCACH05	Industrial Product Characterization Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2T02NCACH06	Instrumental Methods of Analysis	2-0-1	60	2	15	10	25	25	50
				660	22					550

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