



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. Advanced Organic 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. Advanced Organic Chemistry are expected to attain the following Graduate Attributes:

GA1: Disciplinary Knowledge: Demonstrate advanced and in-depth knowledge of organic chemistry and its allied disciplines.

GA2: Research Competence: Employ scientific research techniques, methodologies, and investigative approaches in chemical studies.

GA3: Critical Thinking: Critically examine, interpret, and integrate scientific information and evidence.

GA4: Problem Solving: Address and resolve intricate chemical problems across both known and novel situations.

GA5: Experimental Skills: Apply experimental skills with accuracy, safety awareness, and professional responsibility in laboratory practices.

GA6: Application Skills: Utilize conceptual knowledge to develop practical solutions for industrial, environmental, and societal issues.

GA7: Communication Skills: Present scientific concepts clearly and effectively through oral, written, and digital communication.

GA8: Data Analysis: Analyse and interpret both numerical and descriptive data using appropriate statistical and computational methods.

GA9: Digital Literacy: Apply digital technologies, chemical software, and scientific databases for research and analysis.

GA10: Ethics and Integrity: Maintain high standards of research ethics, academic honesty, and professional conduct.

GA11: Environmental Awareness: Integrate sustainable practices and green chemistry principles in scientific work.

GA12: Teamwork and Leadership: Collaborate effectively in team environments and exhibit leadership in academic and research activities.

GA13: Lifelong Learning: Pursue independent learning and demonstrate commitment to continuous skill enhancement.

GA14: Entrepreneurship Skills: Leverage chemical expertise for innovation, entrepreneurial ventures, and industrial development.

GA15: Social Responsibility: Contribute to community and societal advancement through responsible and ethical scientific practices.

Programme Educational Objectives (PEOs):

Within 3-5 years of completing M.Sc. Advanced Organic Chemistry programme, graduate will be able to:

PEO1: Establish a successful professional career in the pharmaceutical, agrochemical, or specialty chemical industries by applying advanced synthetic and analytical expertise.

PEO2: Contribute to research and development in chemical industries and research organisations by designing innovative chemical processes and products.

PEO3: To lead multidisciplinary teams in laboratory management and quality control, ensuring high operational standards and safety compliance in chemical manufacturing.

PEO4: Implement "Green Chemistry" and sustainable biopolymer technologies to solve industrial and environmental challenges through atom-economical processes.

PEO5: Demonstrate professional ethics and academic integrity in scientific data reporting and the responsible handling of hazardous chemical substances.

PEO6: Adapt to rapidly evolving chemical technologies through continuous professional development and lifelong learning in advanced organic chemistry.

Program Learning Outcomes (PLOs):

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

PLO1. Synthesize complex organic molecules, including pharmaceuticals, heterocycles, natural products, and functional materials, using modern synthetic methodologies with precision, safety, and environmental responsibility.

PLO2. Characterize and elucidate the structure of organic compounds using advanced spectroscopic and analytical techniques such as NMR, Mass spectrometry, IR, UV-Visible spectroscopy, and chromatographic methods.

PLO3. Design retrosynthetic pathways and reaction strategies for target molecules by applying mechanistic principles, functional group transformations, and modern catalytic approaches in organic synthesis.

PLO4. Apply critical thinking and analytical reasoning to solve complex scientific and professional problems in academic, industrial, and research settings.

PLO5. Utilize modern computational, statistical, and digital tools for data analysis, modeling, and scientific reporting.

PLO6. Plan, conduct, and document independent research or project work systematically while maintaining scientific rigor and quality standards.

PLO7. Work effectively as an individual and as a member or leader in multidisciplinary teams to accomplish shared professional goals.

PLO8. Communicate scientific concepts, experimental results, and technical information clearly and effectively through oral, written, and digital formats.

PLO9. Demonstrate professional ethics, integrity, and safety awareness in laboratory practices, research activities, and workplace environments.

PLO10. Recognize the environmental, societal, and industrial impact of chemical processes and promote sustainable and responsible scientific practices.

PLO11. Engage in lifelong learning and adapt to emerging technologies, innovations, and evolving scientific knowledge.

PLO12. Develop leadership, management, and entrepreneurial skills for career advancement in academia, industry, research organizations, or self-employment.



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

M.Sc. Advanced Organic 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	P2TNC01AOC01	Conceptual Inorganic Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC01AOC02	Principle of Organic Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC01AOC03	Selected topics of Physical Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC01AOC04	Organic and Inorganic Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2TNC01AOC05	Physical and Analytical Practical	0-8-0	120	4	30	20	50	50	100
DSC	P2TNC01AOC06	Analytical Chemistry	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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M.Sc. Advanced Organic Chemistry

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	P2TNC02AOC01	Organic Spectroscopy	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC02AOC02	Name Reactions and Reagents in Organic Chemistry	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC02AOC03	Molecular Orbital Theory and Pericyclic Reaction	4-0-1	120	4	30	20	50	50	100
DSC	P2TNC02AOC04	Organic Preparation and Ore-Alloy Analysis	0-8-0	120	4	30	20	50	50	100
DSC	P2TNC02AOC05	Industrial Product Analysis	0-8-0	120	4	30	20	50	50	100
DSC	P2TNC02AOC06	Polymer Chemistry	2-0-1	60	2	15	10	25	25	50
				660	22					550

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