

Sarvodaya Kelavani Samaj managed,

**Shri Manibhai Virani and**



**Smt. Navalben Virani Science**

**College (Autonomous)**

**(Affiliated to Saurashtra University, Rajkot)**

Re-Accredited at 'A' Level by NAAC

STAR college Scheme & Status by MST-DBT

UGC- College with Potential for Excellence (CPE)

UGC-DDU KAUSHAL Kendra

GAAA –Grade A-1 by KCG, Government of Gujarat

GPCB-Government of Gujarat approved Environment Audit Center

Nodal Center for capacity building by GSBTM

## **DEPARTMENT OF CHEMISTRY**

**M.Sc. Chemistry**

**(Specialization in Pharma Organic Chemistry)**

### **Scheme of Instruction and Examinations**

## Vision

The Department of Chemistry endeavors to be recognized for excellence in Teaching – Learning adjunct by empowering graduating students to compete in and contribute to the developing needs of the society

## Mission

Department of Chemistry strives to:

- To provide quality teaching-learning, research and service opportunities leading to holistic development of students through collegial exchange of ideas, independent thought, and the highest ethical standards.
- To provide high quality academic experiences through comprehensive & relevant curriculum at all UG & PG levels.
- To foster research aptitude by extending infrastructural support and research guidance.
- To inculcate the values of multi-disciplinary approach and innovative thinking by facilitating learning experiences in the field of chemical sciences and its allied fields
- To produce knowledgeable graduates for careers in academia, industry and GOs/NGOs.
- To promote ethical and professional environment amongst faculties and students of the department.

## List of Program Outcomes (POs)

PO No.	PO detail
PO <sub>1</sub>	<b>Depth and breadth of knowledge:</b> To prepare efficient chemistry graduates with strong fundamental knowledge to cater the needs of industries/laboratories/Academics related to chemistry.
PO <sub>2</sub>	<b>Practice, Operation and usage of modern tools and technology:</b> To inculcate technical skills in the chemistry graduates towards the use of modern & sophisticated instruments, equipments & cheminformatic tools to analyze and obtain molecular information of the material.
PO <sub>3</sub>	<b>Research, numeracy and scholarship:</b> To develop ability among graduates to work for the effective & practical solutions for issues related to chemical science while complying with economical, environmental, ethical, and safety aspects.
PO <sub>4</sub>	<b>Professional capacity and passion of learning:</b> To provide graduates who can skilfully utilize the chemical literature to assess & identify problems significant to industries & society.

<b>PO<sub>5</sub></b>	<b>Global, moral and aesthetic sustainability:</b> To enrich graduates with contemporary training in professional responsibility, including ethics, the global and societal impact of scientific decisions, and the need for lifelong learning.
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**List of Program Specific Outcomes (PSOs):**

<b>PSO-Side Heading</b>	<b>PSO No.</b>	<b>PSO detail</b>
<b>Fundamental Knowledge</b>	<b>PSO<sub>1</sub></b>	Understand the traditional core of chemistry and acquire the ability to apply chemistry knowledge for qualitative or quantitative behavior of molecules to a broad variety of chemical problems.
	<b>PSO<sub>2</sub></b>	Understand and demonstrate a working knowledge of specialized area comprising Organic / Analytical / Pharmaceutical chemistry
<b>Technical Skill</b>	<b>PSO<sub>3</sub></b>	Design and perform a broad variety of analytical and synthetic experiments
	<b>PSO<sub>4</sub></b>	Show ability to use the techniques, skills, and modern tools necessary for chemistry domain.
<b>Research Skill</b>	<b>PSO<sub>5</sub></b>	Comprehend and apply chemical literature for effective problem solving
	<b>PSO<sub>6</sub></b>	Examine and critically evaluate the experimental results and extend the knowledge with skills to secure placement.
<b>Critical Thinking</b>	<b>PSO<sub>7</sub></b>	Apply critical thinking skills for the environmental issues & Sustainable development through chemistry research
<b>Effective Communication</b>	<b>PSO<sub>8</sub></b>	Communicate scientific information orally and in writing.
<b>Self-directed and life-long learning</b>	<b>PSO<sub>9</sub></b>	Acquire the ability to engage in independent and life- long learning in the broadest context socio- technological changes.
<b>Ethics</b>	<b>PSO<sub>10</sub></b>	Appraise and Demonstrate professional & ethical responsibility with Universal brotherhood ( <i>Atmiyata</i> )

**SCHEME OF INSTRUCTION AND EXAMINATIONS**  
**For Students Admitted from A.Y. 2019 & Onwards**

<b>M.Sc. Chemistry Semester-I</b>									
Subject Code	Course	Hrs. of Instruction			Exam Duration (Hrs)	Max. Marks			Credit
						CIA	SEE	Total	
<b>Part - I</b>									
		Th	Pr	Tu					
19PCHCC101	<b>Core 1:</b> Organic Chemistry	4	-	-	3	40	60	100	4
19PCHCC102	<b>Core 2:</b> Analytical Chemistry	3	-	-	3	40	60	100	3
19PCHCC103	<b>Core 3:</b> Inorganic Chemistry	4	-	-	3	40	60	100	4
19PCHCC104	<b>Core 4:</b> Physical Chemistry	3	-	-	3	40	60	100	3
19PCHID101/ 19PCHID102	<b>DSE - ID-1:</b> ● Industrial Environment Management / ● Chemistry of Biomolecules	4	-	-	2	50	50	100	4
19PCHCC105	<b>Practical Core 1 &amp; 2:</b> Organic & Analytical Chemistry	-	6	-	6	40	60	100	3
19PCHCC106	<b>Practical Core 3 &amp; 4:</b> Inorganic & Physical Chemistry	-	6	-	6	40	60	100	3
<b>Part - II</b>									
	<b>CEC-I:</b> Scientific Writing (Chem Draw Tools Training)	1	-	-	-	Remarks at the End of SEM-II			-
	<b>*CEC- II</b> STC/Online Courses/ Professional Certification Courses	Remarks at the End of SEM-IV							-
	Value Education for Consciousness Development	1	-	-	-	Remarks at the End of SEM-II			-
	<b>TOTAL</b>	<b>32</b>						<b>700</b>	<b>24</b>

\*Relevant Self learning Short Term Course (STC)/ Online courses/Professional Certification Courses from choice approved by AC.

**M.Sc. Chemistry  
Semester-II**

Subject Code	Course	Hrs. of Instruction			Exam Duration (Hrs)	Max. Marks			Credit
						CI A	SE E	Total	
<b>Part - I</b>									
		Th	Pr	Tu					
19PCHCC201	<b>Core 5:</b> Separation Techniques	4	-	-	3	40	60	100	4
19PCHCC202	<b>Core 6:</b> Organic Reactions & Rearrangements	3	-	-	3	40	60	100	3
19PCHCC203	<b>Core 7:</b> Stereochemistry	3	-	-	3	40	60	100	3
19PCHCC204	<b>Core 8:</b> Modern Analytical Techniques	3	-	-	3	40	60	100	3
19PCHID201/ 19PCHID202	<b>DSE - ID-2:</b> ● Statistical Methods / ● Chemical Technology	4	-	-	2	50	50	100	4
19PCHCC205	<b>Practical Core 5 &amp; 6:</b> Separation Techniques & Organic Synthesis	-	6	-	6	40	60	100	3
19PCHCC206	<b>Practical Core 7 &amp; 8:</b> Stereochemistry & Modern Analytical Techniques	-	6	-	6	40	60	100	3
<b>Part - II</b>									
19PCHCE01	<b>CEC-I:</b> Scientific Writing (Research review & presentation)	1	-	-	-	Remarks			2
	<b>*CEC- II</b> STC/Online Courses/ Professional Certification Courses	Evaluated at the End of SEM-IV							-
19LSVE01	Value Education for Consciousness Development	1	-	-	-	Remarks			2
	<b>TOTAL</b>	<b>31</b>						<b>700</b>	<b>27</b>

\*Relevant Self learning Short Term Course (STC)/ Online courses/Professional Certification Courses from choice approved by AC.

#After successful completion of Semester -I & Semester -II, option for student to select one of the Sub disciplines viz., Organic Chemistry **OR** Analytical Chemistry in Semester -III & Semester -IV.

M.Sc. Chemistry (Pharma Organic Chemistry) Semester-III									
Subject Code	Course	Hrs. of Instruction			Exam Duration (Hrs)	Max. Marks			Credit
		Th	Pr	Tu		CI A	SE E	Total	
<b>Part - I</b>									
19PCHCC301	<b>Core 9:</b> Interpretative Molecular Spectroscopy (Self study)	1	-	-	3	50	50	100	3
19PCHCC302	<b>Core 10:</b> Medicinal Chemistry	4	-	-	3	40	60	100	4
19PCHCC303	<b>Core 11:</b> Pharmaceutical Formulations	4	-	-	3	40	60	100	4
19PCHDC301/ 19PCHDC302	<b>DSE –Core 1:</b> Heterocyclic Chemistry / Organic Synthesis: A Disconnection Approach	4	-	-	3	40	60	100	4
19PCHGE01	<b>Generic Elective</b>	2	-	-	-	100	-	100	2
19PCHCC304	<b>Practical Core 10 &amp; 11:</b> Medicinal Chemistry & Pharmaceutical Formulations	-	9	-	6	60	90	150	4
19PCHDC303/ 19PCHDC304	<b>Practical DSE –Core 1:</b> ● Heterocyclic Chemistry ● Organic Synthesis	-	3	-	3	20	30	50	2
	<b>Core 12:</b> Project/Internship/Skill Training/Advance Practical (Research proposal & presentation)	-	3	-	-	Evaluated at the End of SEM-IV			2#
<b>Part - II</b>									
	<b>*CEC- 2 :</b> STC/ Online Courses / Professional Certification Courses	-	-	-	-	Evaluated at the End of SEM-IV			-
	<b>TOTAL</b>	<b>30</b>						<b>700</b>	<b>23</b>

\*Relevant Self learning Short Term Course (STC)/ Online courses/Professional Certification Courses from choice approved by AC offered in semester I and evaluated at the end of semester IV.

# Only for the student who take exit at end of Semester-III. The Core 12: Dissertation course code be 19PCHOCC305 and student will be only evaluated for 2 credits.



M.Sc. Chemistry (Pharma Organic Chemistry) Semester-IV									
Subject Code	Course	Hrs. of Instruction			Exam Duration (Hrs)	Max. Marks			Credit
						CIA	SEE	Total	
<b>Part - I</b>									
		Th	Pr	Tu					
19PCHCC401	<b>Core 12:</b> Project/Internship/Skill Training/Advance Practical	-	20	-	6	80	120	200	12
19PCHCC402	<b>Core 13:</b> Chemistry of Natural Products	4	-	-	3	50	50	100	4
19PCHCC403	<b>Core 14:</b> Chemistry of Synthetic Drugs	4	-	-	3	50	50	100	4
<b>Part - II</b>									
19PCHCE02	<b>*CEC- 2 :</b> STC/ Online Courses / Professional Certification Courses	Successfully completion of the courses certified by provider and Approval by the Department						2	
	<b>TOTAL</b>	<b>28</b>						<b>400</b>	<b>22</b>
<b>Grand Total</b>								<b>2500</b>	<b>96</b>

\*Relevant Self learning Short Term Course (STC)/ Online courses/Professional Certification Courses from choice approved by AC.



### TOTAL MARKS & CREDIT DISTRIBUTION

<b>Sr. No.</b>	<b>PART</b>	<b>Total Marks</b>	<b>Total Credits</b>
1.	<b>PART-I: Core, DSE Courses &amp; GE Courses</b>	<b>2500</b>	<b>90</b>
2.	<b>PART-II : Competency Enhancement Courses</b>	-	<b>04</b>
3.	<b>PART-II : Value Education for Consciousness Development</b>	-	<b>02</b>
<b>TOTAL</b>		<b>2500</b>	<b>96</b>

## DISTRIBUTION OF COURSES

### ● Part – I: CORE & DSE-CORE

#### CORE COURSES [Theory]

SN	Semester	Course Code	Course
1.	I	19PCHCC101	Organic Chemistry
2.		19PCHCC102	Analytical Chemistry
3.		19PCHCC103	Inorganic Chemistry
4.		19PCHCC104	Physical Chemistry
5.	II	19PCHCC201	Separation Techniques
6.		19PCHCC202	Organic Reactions & Rearrangements
7.		19PCHCC203	Stereochemistry
8.		19PCHCC204	Modern Analytical Techniques
9.	III	19PCHCC301	Interpretative Molecular Spectroscopy (Self study)
10.		19PCHCC302	Medicinal Chemistry
11.		19PCHCC303	Pharmaceutical Formulations
12.	IV	19PCHCC402	Chemistry of Natural Products
13.		19PCHCC403	Chemistry of Synthetic Drugs

### CORE COURSES [Practical]

SN	Semester	Course Code	Course
1.	I	19PCHCC105	Organic & Analytical Chemistry Practical
2.		19PCHCC106	Inorganic & Physical Chemistry Practical
3.	II	19PCHCC205	Separation Techniques Practical & Organic Synthesis
4.		19PCHCC206	Modern Analytical Techniques Practical & Stereochemistry
5.	III	19PCHCC304	Medicinal Chemistry & Pharmaceutical Formulations
6.			Project/Internship/Skill Training/Advance Practicals (Research proposal & presentation)
7.	IV	19PCHCC401	Project/Internship/Skill Training/Advance Practicals

### DSE INTER DISCIPLINARY (DSE-ID) & DSE CORE COURSES [Theory & Practical]

Students are required to opt for any one of the courses offered in each semester respectively.

SN	Semester	Theory		Practical	
		Course Code	Course	Course Code	Course
1.	I	19PCHID101/ 19PCHID102	Industrial Environment Management / Chemistry of Biomolecules	-	-
2.	II	19PCHID201/ 19PCHID202	Statistical Methods / Chemical Technology	-	-
3.	III	19PCHDC301 / 19PCHDC302	Heterocyclic Chemistry / Organic Synthesis: A Disconnection Approach	19PCHDC303/ 19PCHDC304	Heterocyclic Chemistry/ Organic Synthesis

### ● Part – II: COMPETANCY ENHANCEMENT COURSES (CEC)

SN	Semester	Course Code	Course
1.	I	-	<b>CEC-I:</b> Scientific Writing
2.		-	<b>*CEC- 2 :</b> STC/ Online Courses / Professional Certification Courses
3.		-	Value Education for Consciousness Development
4.	II	19PCHCE01	<b>CEC-I:</b> Scientific Writing
5.		-	<b>*CEC- 2 :</b> STC/ Online Courses / Professional Certification Courses

6.		19LSVE01	Value Education for Consciousness Development
7	III	-	*CEC- 2 : STC/ Online Courses / Professional Certification Courses
8	IV	19PCHCE02	*CEC- 2 : STC/ Online Courses / Professional Certification Courses

● **Courses offered by Chemistry Department to PG students of other departments**

**I: DSE – ID Courses [Theory]**

<b>S N</b>	<b>Semeste r</b>	<b>Course Code</b>	<b>Course</b>	<b>Name of Program</b>
1.	II	19MICID202	DSE-ID 2: Medicinal Chemistry-I	M.Sc. Industrial Chemistry

● **Generic Elective Course offered to other department**

<b>S N</b>	<b>Semeste r</b>	<b>Course Code</b>	<b>Course</b>	<b>Name of Program</b>
1.	II	19PCHGE01	Generic Elective	Other department of the College

- Student has to choose the Generic elective courses from the common pool offered by the other department of the college